THE IRON TRADE REVIEW

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CAR INQUIRIES

PENDING ESTIMATED AT FORTY THOUSAND.

Heavy Buying of Gray Forge, Low Phosphorus and Basic Pig Iron—Import Movement Not Yet Heavy.

Railroads have given further evidences of their intention to buy liberally, and it is now estimated that 40,000 cars are under negotiation, including 10,000 for the Pennsylvania. Other evidences of prosperity have not been lacking during the past week, but the weakness of the old material market in several centers, the difficulty that has been experienced in establishing $15 as the price for No. 2 foundry iron at Birmingham, and the rather exasperating competition of brokers which has kept down the price of basic pig iron in the Pittsburg district, all indicate that the continuance of the conservative policy, which has generally been adopted by both mills and furnaces, is important. This policy is reflected in the unfilled orders of the Steel Corporation, shown in the report for the quarter ending Sept. 30, the tonnage being smaller than that given in 16 quarterly reports of the Steel Corporation, while the net earnings for the past quarter have been exceeded in only four quarterly reports in the corporation's history. The comparatively small tonnage of unfilled orders for the last quarter is due to the extremely cautious policy pursued this year in making contracts, which in former years amounted to no more than an option to buy with the privilege of cancelling if prices declined.

Pig Iron Buying

The leading cast iron pipe interest has purchased 60,000 tons of gray forge. Other important pig iron transactions of the week were 30,000 tons of basic to a St. Louis melter, 10,000 tons of basic to the American Steel Foundries, and 18,000 tons of low phosphorus to the Standard Steel Works, Philadelphia. Following the rather heavy selling of basic in the east and the unexpected blowing out of a large furnace for relining, basic producers in that territory have advanced to a basis of $19, delivered, for shipment up to second quarter, and state that even at this level production costs have reached such a figure that the operation of some new capacity which will be available about the first of the year may be delayed. It is evident in the east that pig iron production is practically at its maximum for the year, as the blowing in of the small stacks still idle and those now building will be offset by a good many being forced out for repairs. The same condition is true in the central west, although the blowing in of new stacks at Gary will be an important factor.

Iron Ore Conditions

Trans-Atlantic ore freight rates continue their advance, and eastern furnacemen are becoming anxious concerning their winter supply. Eastern furnaces have bought 50,000 tons of ore from one interest. On the lakes, the ore movement continues heavy, and there are not enough vessels to meet the demand.

Import Movement

The import movement has not yet assumed important proportions, although two or three additional vessels have been chartered for British shipments of pig iron, and the arrival of a steel scrap cargo has given the eastern market for heavy melting steel a decidedly easier tone. The government decision which will not allow the admission, at the tariff rate on scrap, of crop ends for reheating will check the importing of that kind of material. Aside from the influence of importations, the scrap market is easier, and shows some weakness in the Chicago district.

Crude Steel

Many sellers of semi-finished steel are consulting their own interests before committing themselves for future delivery, and are declining to open their books until they can estimate their own probable needs. Some further importations of German steel are reported, and inquiries for large tonnages are pending.

HEAVY RAILROAD BUSINESS PENDING.

(Special Telegram.)

New York, Oct. 27.—Forty thousand cars are now under negotiation. The Carnegie Steel Co. reports rail sales of 9,000 including 3,500 to the Bessemer and Lake Erie. The Illlinois Steel Co.'s sales were 2,800 including one large lot. The New York Central order is near placing and about 50,000 tons from other roads are practically closed.

Eastern furnaces have bought 50,000 tons of ore from one interest.

PIG IRON BUYING IN EASTERN TERRITORY.

(Special Telegram.)

New York, Oct. 27.—The leading pipe interest has purchased 60,000 tons of southern and Virginia gray forge for western shipment. There is heavy buying of malleable in Connecticut, with large inquiry for malleable and basic. Several foundries are in the market for first half.

SHIP YARDS SOLD.

San Francisco, Oct. 23.—The Fulton Ship Building & Engineering Works, the land and properties, have been conveyed to the San Francisco & Fresno Land Co., and the plant is to be reopened in the near future. The Fulton Iron Works Co., once a prosperous institution, lost its prestige of late years. When labor conditions in San Francisco made it unprofitable to operate the plant, it was closed down and has been in the market since.

THE WEEK IN IRON CENTERS

PITTSBURG.

Satisfying Conditions in Nearly All Lines—Pig Iron Firm.

Office of THE IRON TRADE REVIEW,
510 Park Building, Oct. 26.

Conditions in the iron and steel market have advanced to the point where the situation is a very favorable and gratifying one from a seller's or maker's standpoint. Mill books are filled with orders and capacities are being taxed in some lines so that no longer the problem of reviving trade, but rather that of handling present business, is of first importance. Buyers are clamoring for material and in the face of the strengthening market, are bending energies to cover for their extended needs. The steel maker now finds himself in a strong position to discriminate between offerings and to exercise a more complete control over the factor of speculative effort.

There is no evidence, however, that the producer is inclined to take advantage of present conditions at the expense of the consumer. On the contrary, the impression is being given out that sound and reasonable policies will govern in the advance of prices. Especial efforts are being put forth to hold consumers to their actual needs and to make tonnages entered represent their full face value in future specifications.

One of the most interesting phases of the market is that of semi-finished steel. As a rule, buyers are well protected for their needs this year and some for longer periods through scale contracts and other special arrangements. There are many makers of finished lines who have been obtaining their raw steel needs from the open market, and they are now attempting to cover for the incoming year. The regular sellers of semi-finished steel, however, are generally adopting a policy of self-protection and are declining to open their books until they are able to ascertain the probable needs of their own operations and those of their constituent companies, since even now there are instances of prominent makers being short on their steel supplies. Until they are able to fortify themselves on their raw materials, some makers of finished lines are extremely conservative in booking forward business at ruling prices. The sheet bar situation is notably acute. The tenseness of the domestic steel situation is promoting the interest of buyers in the foreign markets and further importations have been recently made to eastern seaboard points, while the pending inquiry has reached large proportions.

Car shortages are more pronounced in the coal and coke districts. Coke makers are having difficuity to obtain enough box cars for their shipments to foundries, while the movement to blast furnaces is also being retarded because of the heavy demand for rack cars. Coal shippers are suffering the most and are being seriously handicapped in maintaining the fall movement to upper lake ports through lack of cars and inadequate forces of mine labor.

Iron Ore.—A Philadelphia furnace has purchased 10,000 tons of Mesabi non-Bessemer ore for prompt shipment from a local seller at the regular price of $3.50 per ton.

Pig Iron.—The Pittsburg district has experienced a week noteworthy in its quietness when compared with the activity and the heavy selling that has recently been done in this market. Prices, however, have shown no defection and the expectation is general among furnace men and sellers that any buying of extent will send up the market to higher points. Western consumers of basic, which have been vigorously sounding the valley districts, have made their purchases elsewhere.

Bessemer sales of the week include 3,000 tons for shipment this year to an eastern steel company at $19, valley; 1,000 tons to a merchant interest for prompt delivery at $19, valley, and 500 tons for first half to a local foundry company at $19, valley. Some attention in the market has been directed to a sale of 2,400 tons of malleable for delivery in equal monthly installments over 1910, made to a local maker at not over $17.50, valley. Some makers have been holding their malleable for any shipment at $18, valley. A sale of 200 tons of a special grade of high silicon Bessemer for prompt shipment was made at $20, valley.

A rather unusual market factor in basic pig iron is the presence of some speculative tonnage in the hands of persons wholly outside the iron and steel industry. One of these parties is reported to have 15,000 tons bought at the low mark early in the year and is holding for a price of $17.95, valley. The basic market in this territory is rather quiet at present. Outside consumers have been buying liberally, however, from furnaces located at advantageous points. The American Steel Foundries took 10,000 tons for first quarter shipment at St. Louis, 5,000 tons of which was Virginia and 5,000 tons St. Louis iron. The delivery price was $19.50, equivalent to $15.90, Virginia furnace. The Scullin-Gallagher Iron & Steel Co., St. Louis, bought 15,000 tons of northern basic from an Ohio furnace at about $17.25, furnace, the iron to be shipped 5,000 tons this year, 5,000 tons first quarter and 5,000 tons second quarter. Other basic inquiry is pending.

Few negotiations for foundry iron are now being carried on. Prices range from $17.25 to $17.50, the latter being asked for forward shipment and in some cases for prompt iron. A sale of 500 tons of forge iron for shipment this year at $16.50, valley, is noted. On prompt and shipment this year on northern iron, we quote as follows:

Bessemer, valley	$ 19.00
Bessemer, Pittsburg	19.90
No. 2 foundry, Pittsburg	18.15
Gray forge, Pittsburg	17.40 to 17.65
Basic, valley	17.25
Basic, Pittsburg	18.15

Ferro-Alloys.—A stronger tone is to be noted in ferro-manganese and the market generally is on the rise in line with the recent advance in manganese ore. Higher prices on both prompt and future material are being predicted. There is not a great deal of activity in ferro-manganese or in any of the alloys, but sales made of the former have been at higher levels.

We quote ferro-manganese at from $43.50 to $44, Baltimore, prompt shipment, or for delivery this year and the first half of 1910, $44.50 to $45.50, Baltimore, or $45.50 to $46.50 for second half. The freight from Baltimore to Pittsburg is $1.95.

Fifty per cent ferro-silicon is quoted at $64 to $65, Pittsburg; domestic 12 per cent, $26; 11 per cent, $25; 10 per cent, $24, Pittsburg, for prompt with $1 advance for first quarter and $2 for first half. The foreign grades are held at advanced prices.

Plates.—The Pennsylvania Railroad Co. is now in the market for an additional lot of 10,000 cars to be delivered next year. Included in this total are several thousand extra large steel hopper cars, which will have a capacity of 140,000 pounds each, and each will require about 20 tons of steel material exclusive of the trucks. It develops that the total car order recently placed by the New York Central lines with the American Car & Foundry Co. calls for 5,800 cars, which is 1,800 larger than

first reported. Plate makers have been receiving unusually heavy specifications during the past month and are farther behind than ever on deliveries. There has been considerable selling into next year on specific contracts, some of which have been placed at 1.60c, Pittsburg. The present range of prices, however, continues from 1.50c to 1.60c. We quote present plate prices as follows:

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.50c to 1.60c. Extras are as follows per 100 pounds: Boiler and flange steel plate, 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½-inch to and including 3/16-inch plate on thin edge, 0.10c; under 3/16 to and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—Leading makers report extremely heavy specifications in sheets are being received from the manufacturing and jobbing trades. There is also a very active buying movement for the first quarter with those mills which are willing to accept such business. Some of the independent sheet makers are, however, not selling beyond the present year. In the future buying now under way, the mills are having some trouble in eliminating the speculative element since many consumers are given to discounting the rising market through increased estimates of needs. Some of the mills are sold up for the remainder of the year and quick shipments, particularly in blue annealed sheets, cannot be obtained. The same condition applies to any assortment of galvanized sheets. The advance in the spelter market and the increased cost of crude steel are causing some galvanized sheet makers to book business more cautiously. The La Belle Iron Works is increasing its sheet mill operations in the face of a strike and this week is running seven out of ten mills. We quote the present schedule of prices as follows:

Blue annealed sheets, Nos. 3 to 8, 1.65c; Nos. 9 to 10, 1.70c; Nos. 11 and 12, 1.75c; Nos. 13 and 14, 1.80c; Nos. 15 and 16, 1.90c; box annealed sheets, Nos. 10 to 12, 1.95c; Nos. 13 and 14, 2.00c to 2.05c; Nos. 15 and 16, 2.05c to 2.10c; Nos. 17 to 21, 2.10c to 2.15c; Nos. 22 to 24, 2.15c to 2.20c; Nos. 25 and 26, 2.20c to 2.25c; No. 27, 2.25c to 2.30c; No. 28, 2.30c to 2.35c; No. 29, 2.35c to 2.40c; No. 30, 2.45c to 2.50c; galvanized sheets, Nos. 13 and 14, 2.35c to 2.40c; Nos. 15 and 16, 2.45c to 2.50c; Nos. 17 to 21, 2.55c to 2.60c; Nos. 22 to 24, 2.70c to 2.75c; Nos. 25 and 26, 2.90c to 2.95c; No. 27, 3.10c to 3.15c; No. 28, 3.30c to 3.35c; No. 29, 3.45c to 3.50c; No. 30, 3.70c to 3.75c; painted roofing sheets, $1.60 per square for No. 28 gage, 2½-inch corrugation, and galvanized roofing sheets, $2.85 per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—Some of the manufacturing consumers which have recently contracted for first quarter, are already specifying for delivery during that period for a part of their regular needs. There is practically no unsold plate to be offered this year, and deliveries on current specifications which are heavy, are several months behind. Consumers and jobbers are freely endeavoring to contract for first quarter. Scarcity and the price indefiniteness of sheet bars for future shipment are causing some makers to hold back in the selling of their outputs. The western fish packers have not as yet entered the market for their needs. The American Sheet & Tin Plate Co. this week is running full its Sharon plant of 20 mills for the first time since the Amalgamated strike. We quote the present market as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.50 f. o. b. mill, Pittsburg district.

Rails and Track Material.—The past week has shown no developments of importance in steel rails. The local maker is regularly booking sufficient tonnage in 1,000-ton and smaller lots for quick shipment which, with current specifications, is keeping the Edgar Thomson mills running at fair schedules. There is no pushing of production, however. The outlook for capacity operations of the mills for next year is very promising. The demand for light rails is good and base prices are up fully $1 a ton in recent sales. The local maker entered 2,000 tons the past week. Much buying of spikes and track fastenings in general is being done. We quote the market on Bessemer rails as follows, the base price for open-hearth rails being $30 mill.

Fifty-pound and heavier, 500-ton and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails on base weight of 40 to 45 pounds, $28, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.70c to 1.75c, Pittsburg; hand spikes, 1.75c to 1.80c, Pittsburg.

Steel.—Additional sales of German semi-finished steel have been made to Atlantic coast and contiguous seaboard territory during the past week. The steel imported for early shipment is largely of special carbonizations appropriate for particular branches of manufacture. A heavy inquiry for foreign crude steel of all forms is generally current in this country and further importation to favorably-located buyers will likely follow. While it is reported that some of the smaller mills have made prices on semi-finished steel for next year's delivery, the principal makers are still refraining from such action. Buyers are becoming more and more concerned over the steel situation, in which there is an apparent scarcity of purchasable material and a likelihood of high prices compared with the present level of finished products. Another unsatisfactory element encountered is the inability of some mills to deliver full quotas of steel on present contracts. Prices are practically nominal as there is little steel to be had at any price. Sales of open-hearth billets have been made as high as $28 mill for small lots and a few lots of Bessemer are going at about $26.50, Pittsburg.

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $26 to $26.50, Pittsburg, with the usual extras for size and analysis, and open-hearth rolling billets from $26.50 to $27, Pittsburg. Forging billets are held at $29 to $30, Pittsburg. Sheet and tin bars are quoted at $28 to $29, Pittsburg.

Hoops and Bands.—The market in hoops is gaining strength and some makers are asking a price of 1.65c, Pittsburg, to buyers outside the regular customers. The small miscellaneous trade is specifying very heavily and shipments are far behind, but deliveries can still be made by the mills to the large cooperage trade. Large buyers in hoops are covered up to the first of the year, but not beyond. The movement in bands is strong. We quote the market as follows:

Hoops in carload lots, 1.50c to 1.60c; in less than carload lots, 1.60c

to 1.70c; bands, 1.40c to 1.50c, base, with net extras as per standard steel.

Merchant Bars.—Bar consumers are showing a willingness to contract heavily for first quarter and there is a very liberal buying movement in progress. The mills are, however, exerting efforts to eliminate the speculative feature of contracting by holding out the impression to customers that there is no intention to take advantage of present conditions to put up the market to high levels. The contracting movement for first quarter so far has been largely by the consuming trade, as some of the mills have not entertained any propositions from the jobbers. It is expected, however, that the books to this trade will be opened some time in November. It is understood that some of the largest buyers of steel bars who had covered early in the year to Jan. 1, 1910, have extended their contracts under previous price arrangements to apply to their needs over the first half. Steel bar prices continue from 1.40c to 1.50c, Pittsburg, some quotations of 1.40c, mill, having still been encountered the past week, especially in the west. Some western makers of bar iron are taking business through first quarter at advances of from $1 to $2 a ton, but other makers decline to sell beyond this year and are filling their capacities through specifications and prompt business. The minimum Pittsburg mill price remains 1.65c. Shafting is active at the current discounts with two points advance asked for next year's shipments by the mills willing to sell. We quote the present market as follows:

Common iron bars, 1.65c to 1.70c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c to 1.50c; plow and cultivator, 1.40c to 1.50c; channels, angles, zees, tees, under 3-inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds, 0.15c advance; less than 1,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 57 per cent in carloads and 52 per cent in less than carloads, delivered in base territory. Higher prices are asked into next year.

Planished and machine straightened tire is 1.60c base; iron finished tire under 1½ by 1½ inches, 1.55c, both plus net extra on tire card; iron finished tire, 1½ by ½ and over, 1.40c, plus net extra on the steel bar card.

On cold rolled strip steel, width 1½ inches and wider, and 0.100-inch and thicker, we quote base prices for 100 pounds, $3.20 on hard, and $3.45 on soft, except in carload lots of one size where the price is lower.

Structural Material.—Some of the largest makers of plates and shapes in this territory have entered on their books during the past month, a tonnage which is practically double the normal monthly aggregate in these lines. With the mills facing such a deluge of business, it is manifest that deliveries are not likely to show improvement soon, and the indications are rather that shape makers will continue to enter orders to their fullest capacities. Prices in shapes run from 1.50c to 1.60c with premiums being asked by some mills on favorable deliveries. In the fabricating line the inquiry is very ordinary, but there is considerable activity in the way of extensions of plants, in which quick service is usually wanted. The American Bridge Co. has recently started its Ambridge plant on night turn. The Wheeling, Benwood & Bellaire Bridge Co. has taken bids on a steel bridge across the Ohio river connecting these three cities. The bridge will require about 3,000 tons of steel and will be conducted as a private enterprise. The National Fireproofing Co. has taken the general contract for a large wool warehouse to be erected in Boston, and has sub-let the several thousand tons of steel work to the American Bridge Co. We quote shape prices as follows:

Beams and channels, 15-inch and under, 1.50c to 1.60c; over 15 inches, 1.60c to 1.70c; zees, 1.50c to 1.60c; tees, 1.50c to 1.60c; angles, from 3 to 6 inches, 1.50c to 1.60c; over 6 inches, 1.60c to 1.70c; universal and sheared plates, 6¼ inches wide and wider, 1.50c to 1.60c.

Merchant Pipe.—The jobbing and consuming trade continues to specify liberally against its contracts, and new business being placed in merchant pipe is good. Some pipe line work is pending. There has been no selling beyond the present year as far as learned, and some of the mills will only accept business for shipment within 30 days. Deliveries in pipe can be obtained freely in some sizes, and the general situation in this respect is favorable. We quote the following official discounts on merchant pipe subject to an additional one point and five off to jobbers:

	—Steel—		—Iron—	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ inch.....	71	55	66	..
⅜ inch	72	58	67	53
½ inch	75	63	70	58
¾ to 6 inch.....	79	69	74	64
7 to 12 inch.....	74	59	69	52
PLUGGED AND REAMED.				
1 to 4 inch.....	77	67	72	62
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch.....	64	52	59	47
½ to 4 inch.....	71	59	56	54
4½ to 8 inch.....	67	55	62	50
DOUBLE EXTRA STRONG PLAIN ENDS.				
½ to 8 inch.....	60	49	55	44

Boiler Tubes. — Locomotive and merchant buyers continue to enter the market more freely, and there is a sustained improvement in the situation. Some good contracts are being placed, but there is a severe competition among some makers and low prices have resulted. We quote the following official discounts on lap-welded steel boiler tubes to jobbers in carloads:

1 to 1¼ inch.....	49
1¾ to 2¼ inch.....	61
2½ inch	63
2¾ to 5 inch	69
6 to 13 inch	60

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destinations east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

We quote the following official discounts on charcoal iron tubes to jobbers:

1 to 1½ inch	43
1¾ to 2¼ inch.....	43
2½ inch	48
2¾ to 5 inch.....	55
6 to 13 inch.....	43

Wire Products.—The principal contracting in wire products for first quarter delivery at advanced prices of at least $2 a ton is being done by the manufacturing trade for its common wire needs, and very little, if any, selling of barb wire or nails for this shipment has been done to the jobbers. There is going, however, a very fair buying movement for first quarter by the manufacturing consumers. Makers of wire products have been quoting prices to the jobbing trade for 60 days delivery, but as this policy now brings selling up to Jan. 1, it is expected that the quotations applicable to specifications into next year will shortly be made. In view of this situation, some makers have withdrawn their outstanding quotations to these buyers. The jobbers are now specifying very freely on their contracts. There is considerable price irregularity in copper wire, which is attributed generally to the low quotations and probable over-production of this metal. We quote present wire prices for this year's shipment as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to retailers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—Quoted prices on wire

rods are purely nominal, as regular customers are all covered and outside buyers are paying premiums so that each sale is making a market in itself. Some high prices have been paid. We quote nominally Bessemer and open-hearth rods at from $32 to $33, Pittsburg.

Coke.—A contract of importance closed in the week calls for 11,000 tons of furnace coke monthly over the first half of 1910 at a price of $2.90, ovens. The general situation in furnace coke buying is quieter, due to a large extent to the unwillingness of some of the furnaces to pay current prices and to the attitude of some makers in holding firmly for $3 coke. There is considerable contracting in furnace coke yet to be done, however. The spot market has settled around $2.85, ovens, a number of lots having gone this week at this price and it appears to be advancing. There has been some foundry coke contracting at $3.50, ovens, with $3.25 for spot shipment, and some customers are inquiring for their needs over all of next year. Specifications in foundry coke are very heavy. Makers of foundry coke are experiencing much difficulty in obtaining sufficient supplies of box cars from the railroads and some racks are being used. The question of getting out shipments is becoming of paramount importance to these interests. Deliveries on the long-term contract calling for 30,000 tons monthly to the Jones & Laughlin Steel Co., will be started Nov. 1 by the Thompson-Connellsville Coke Co. We quote spot furnace coke at from $2.75 to $2.85, ovens, and on contract from $2.85 to $3, ovens. On first class Connellsville foundry coke we quote at from $3 to $3.25, ovens, for prompt and from $3.25 to $3.50, ovens, on contract. Production in the Connellsville regions for the week ending Oct. 16, show 34,122 ovens active, with an output of 428,313 tons, according to the Connellsville *Courier*, compared with 35,293 active ovens and a production of 437,829 tons the previous week.

Old Material.—There is a slightly easier situation prevailing in the scrap market through the freer offerings of some dealers who have been obliged to move material recently bought. The tightness of conditions is still plainly discernible, however, in buying and selling, principally in the retaining of lots that can be dealt in at a profit at this market, as bullish sentiment predominates among the holders of scrap. Large buyers of heavy steel say they are having less trouble to get tonnages at $18, but $18.50 has been paid in some cases. Higher prices have been obtained for cast, low phosphorous, turnings and re-rolling rails in recent sales. Wrought material is also strong. The mills report sales of low phosphorus up to $22.75, delivered, turnings up to $14.50 and re-rolling rails up to $19.75. Many of the large consumers continue to stay out of the market and represent that they are in strong positions as to their needs for a number of months ahead.

We quote gross tons delivered in the Pittsburg district, including Monessen, Sharon, Brackenridge, Steubenville and Follansbee, as follows:

Heavy melting scrap	$18.00 to 18.50
Rerolling rails	19.00 to 19.50
Bundled sheet scrap	16.00 to 16.50
Iron axles	27.50 to 28.00
Old iron rails	20.00 to 21.00
No. 1 wrought scrap	19.25 to 19.50
Old car wheels	18.50 to 19.00
Low phosphorus	21.50 to 22.50
Machine shop turnings	14.00 to 14.50
Cast borings	11.50 to 12.00
No. 1 cast scrap	17.00 to 17.50
Malleable	16.50 to 17.00
Stove plate	13.50 to 14.00

CHICAGO.

General Conditions Strong, With Temporary Weakness in Scrap.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Oct. 26.

The past week has been a rather quiet one, on the whole, but in spite of that fact, nothing to approach a slump is seen in any line; in fact, a very decided feeling of strength is to be noted in raw material and in finished and semi-finished products. In the one line where anything like weakness has developed—old material—it is considered only a temporary phase of the market, and rather the result of playing it for a little more than it was worth, than any indication that it is the beginning of a steady downward movement. The buying movement, which has been unapparent to any great extent for a number of days, seems to have sprung up again, in some lines, and has set in for what is hoped to be a good, long run. This is apparent, especially in steel rails, of which large tonnages again are being booked. Structural material also is looming up in the way of prospective business. The Pennsylvania Compania Co. has announced that it will begin the erection of its long-deferred passenger station within a year. It is thought that in considerably less time than that, work will be in progress. The estimated cost of the work, as published, is $25,000,000. Geo. W. Jackson, Inc., has purchased a large tract of land and will, it is announced, make large additions to its plant and equipment. The coke situation is unchanged. Connellsville foundry is selling at $3.25, ovens, which is equivalent to $5.90, Chicago; Wise county, Va., is holding at a Chicago equivalent of $5.95; while Pocahontas coke has advanced from $2.75, ovens, to $3, or $5.65, Chicago.

Pig Iron.—The inherent strength in the pig iron situation is well shown in the fact that, in spite of a rather quiet week, and a weakness in the old material market to suggest a slight stampede in other lines, the tone in this market is as firm or firmer than ever. Sales have been, for the most part, of a small-lot character, although there have been a few round lots sold. Local dealers are holding prices very firm, in the face of a rather slack demand. The furnace situation in this territory has not changed much since last report. Federal A has gone out for re-lining, which will put it out of the list of producers for about 30 days. The Spring Valley Furnace, at Spring Valley, Wis., which has been out for some time, will blow in by Nov. 1, if not before. Both Iroquois furnaces are running to maximum capacity. The most interesting transaction reported for the current week is the purchase, on Monday, by independent cast iron pipe interests, of about 15,000 tons of Virginia and Alabama iron. The leading cast iron pipe interest also is understood to be a large buyer of iron at the present time, but figures of tonnage are lacking. Consumers are taking care of their purchases very well, and it is expected that, if sufficient cars can be obtained by Jan. 1, there will have been a good cleaning up of orders. Furnace representatives are urging customers to remove their purchases from the furnace banks, within the time specified, or contracts will be cancelled. This is being done, and it is extremely improbable that many cancellations will be made, as purchasers will not allow low-priced iron to get away from them when nothing but higher prices are in sight for some time to come. It is patent that some bought more largely than their actual wants demanded, but, in the present condition of the market, no trouble should be experienced in taking care of any reasonable amount of pig iron. Lake Superior charcoal iron can still be bought, for this year's delivery, at $19.50, Chicago, but for first quarter of next year, $20 is the price, and for second quarter, $20.50. The Tennessee Coal, Iron & Railroad Co., which has been out of the market for a short time, is now accepting some business when the price and the specifications are satisfactory.

Lake Superior charcoal	$20.00 to 20.50
Northern foundry No. 2	19.00 to 19.50
Southern foundry No. 2	19.35
Southern silveries, 5 per cent silicon	20.35 to 20.85
Jackson Co. silveries, 8 per cent.	21.40
Malleable Bessemer	19.50 to 20.00
Alabama basic	19.35 to 19.85

Billets.—The conditions surrounding the local billet market are unchanged,

all the product of the mills in this territory being consumed in the makers' own works. Considerable difficulty is experienced by consumers of billets in getting their requirements from other markets, as somewhat the same conditions prevail in other quarters.

Merchant Bars.—The bar iron market is very strong, and specifications are coming in at a satisfactory rate, while inquiries are very large. Manufacturers, however, are not trying to push business but are bending their efforts towards taking care of immediate business, which, in many instances, is still ahead of ability to make shipments at all promptly. Store business is holding up to the high level which has been experienced for some weeks, and prices are firmly maintained. Machine and carriage bolts have advanced 5 per cent.

We quote for Chicago delivery, as follows:

Bar iron, 1.50c to 1.55c; hard steel bars, 1.50c to 1.55c; soft steel bars and bands, 1.58c to 1.68c, half extras; soft steel angles, less than 3 x 3, 1.63c to 1.68c, half extras; hoops, 1.63c to 1.68c base, full extras; planished or smooth finished tire steel, 1.73c to 1.78c; iron finish, up to 1½ x ½ inch, 1.63c base, tire card; iron finish, 1½ x ½ inch and larger, 1.43c to 1.48c base, steel card; channel for solid rubber tires, ¾ to 1 inch, 2.03c to 2.08c; and 1⅛ inch and larger, 1.93c to 1.98c; smooth finished machinery steel, 1.83c; flat sleigh shoe, 1.53c; toe calk steel, 2.13c; spring steel, 2.18c; crucible spring steel, 2.68c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 60 per cent off the list for carload lots, and 55 per cent off for less than carload lots, carload freight allowed to points in base territory. On iron and steel bars from local stocks, we quote as follows: Bar iron, 1.80c, base, plus new extras; soft steel bars, 1.80c to 1.90c per 100 pounds base, plus new extras; soft steel hoops, 2.30c, full extras.

Structural Material.—The only unfavorable feature in this market is the inability to get material, which is growing worse, rather than better. The tendency of prices is shown in the action of a leading independent interest in advancing its quotations on shapes and plates to 1.60c, Pittsburg. The amount of business booked in the past week has been large, and there is a good tonnage in sight. Ground has been broken for the new fabricating plant of the American Bridge Co., at Gary, Ind., mentioned last week. A large project which is of more than local interest, but especially to Chicago interests, is the new Pennsylvania Co. depot, which, it is announced, has been decided upon, and the cost of which, it is said, will be in the neighborhood of $25,000,000. It is understood that the plans for this great work have been ready for 18 months, and that bids will be asked in a short time. Among the contracts let, in the past week, the American Bridge Co. secured one for 1,600 tons, from the Idaho-Oregon Power Co., which is building an aqueduct at Oxbow, Ore.; also, one for the Chamber of Commerce, at Portland, Ore., 400 tons; a bag house for the Mammoth Copper Smelter at Kennett, Cal., 500 tons; an addition to the Chicago & Northwestern Railway's ore docks on Lake Superior, 1,800 tons; the Southern Pacific bridge over the American River, near Sacramento, Cal., 2,000 tons. This company also made sales of 1,200 tons of car axles, which brings up the total of sales for this product of the company's works, for this year, to 13,000 tons. Dyer Bros., San Francisco, took the contract for the chapel at the Leland Stanford University, 322 tons, at Palo Alto, Cal., to replace the original structure which was destroyed by the earthquake. Ralston Iron Works secured 800 tons for Pier 34, from the Harbor Commission of San Francisco. A power house at Riverton, Kans., 444 tons, was let to Joplin, Mo., parties.

We quote mill prices for structural shapes, Chicago delivery, as follows:

Beams and channels, 15-inch and under, 1.68c to 1.78c. For extras see Pittsburg report.

Local store prices are as follows: All angles, 3 inches and larger, including 6 inches, $1.90 per 100 pounds; angles over 6 inches, $2.00 per 100 pounds base; beams, 3 to 15 inches, inclusive, $1.90 per 100 pounds base; channels, 3 inches and larger, $1.90 per 100 pounds base.

Rails and Track Supplies.—The buying movement, which had been less active for a few weeks, started up again during the past week and there is a decided improvement in that respect in the last few days. Actual sales have been large and inquiries are improving. The Great Northern road is inquiring for from 10,000 to 40,000 tons of its special standard rail, which probably will go to a western mill. Last year, this road divided its purchases of rails between a number of rail mills. The leading local interest made sales of about 80,000 tons of standard rails, most of which were Bessemer. Business in light rails is more active.

See Pittsburg report for prices on standard sections.

On light rails, Chicago delivery, we quote as follows: Light rails, 40 and 45-pound, $26.00; 30 and 35-pound, $26.75; 16, 20 and 25-pound, $27; 12-pound, $28. In lots of 250 to 500 tons a reduction of 60c a ton from these prices is made; lots of 500 tons and up carry a reduction of $1 a ton. Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.80c to 1.90c; smaller size spikes, 1.85c to 1.90c base; track bolts with square nuts, 2.25c to 2.50c, base; with hexagon nuts, 2.40c to 2.65c.

Plates.—The same strength is apparent in this market which has been reported for weeks, and it would seem that the conditions are even better than ever. Manufacturers are holding their prices very firmly at previous quotations, and one prominent eastern independent has advanced its price to 1.60c, Pittsburg. Warehouse business is as large as ever.

We quote, Chicago delivery, as follows.

Tank plates, ¼-inch thick, 6¼ to 100 inches, 1.68c to 1.78c. For extras see Pittsburg report.

Store quotations are without change, as follows:

Tank steel, ¼-inch and heavier up to 72 inches wide, 1.90c to 2.00c; from 72 inches wide to 96 inches wide, 2.00c to 2.10c; 3/16-inch up to and including 60 inches wide, 2.00c to 2.10c; 72 inches, 2.25c to 2.35c; No. 8 up to 60 inches wide, 2.05c to 2.15c. Flange and head quality, 25c extra.

Sheets.—There is no abatement of the very favorabe conditions existing for weeks in this market, and mill and store interests are enjoying a very marked degree of prosperity. No change in prices has occurred, but former quotations are maintained very firmly.

For mill prices see Pittsburg report, freight to Chicago, 18 cents.

We quote store prices at Chicago as follows: No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.65c to 2.75c; Nos. 22-24, 2.70c to 2.80c; No. 26, 2.75c to 2.85c; No. 27, 2.80c to 2.90c; No. 28, 2.90c to 3c; No. 30, 3.15c; galvanized sheets, Nos. 10 and 16, 3c to 3.10c; Nos. 18 and 20, 3.15c to 3.25c; Nos. 22 to 24, 3.30c to 3.40c; No. 26, 3.50c to 3.60c; No. 27, 3.70c to 3.80c; No. 28, 3.90c to 4c; No. 30, 4.30c to 4.40c.

Wire Products.—This branch of the steel business is securing its share

of the large tonnage which is going, and it is expected that an even larger volume of business will be handled next year. Prospects for a very satisfactory trade, in the spring months, are extremely good.

We quote, Chicago delivery, for the remainder of this year, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13, with 30c for galvanizing; plain wire to jobbers, carload lots, $1.78; staples, bright, $1.98.

Merchant Pipe and Tubes.—Sales offices report their principals well filled on orders for pipe and tubes, a seasonable business being handled. With the approach of cold weather, there is not the same amount of pipe line construction being provided for, but next spring will see a large increase in this part of the business. Pipe and tubes in store are having a very good inquiry.

For mill discounts, see Pittsburg report.

We quote, out of store, as follows: Wrought steel pipe, black, ⅛-inch to ¼-inch, 68 per cent; ⅜-inch, 69 per cent; ½-inch, 72 per cent; ¾-inch to 6-inch, 76 per cent; 7-inch to 12-inch, 71 per cent. Iron pipe about 6 points higher.

Lap-welded steel tubes, 2¾-inch to 5-inch, 60 to 62 per cent; charcoal iron tubes, 2¾-inch to 4-inch, 48 to 50 per cent; seamless steel tubes, 2¾-inch to 4-inch, 47½ per cent.

Cast Iron Pipe.—Only small lettings are reported for the past week, but there is considerable business in sight which will be closed soon. The leading interest sold 200 tons to Kansas City, Kans., where other contracts will be let in a short time. The same interest took a contract for 200 tons for Columbus, O., Valentine, Neb., is letting contracts for 400 tons today, and Lucas, Kans., 200 tons, tomorrow. Prices remain unchanged, since the recent advance.

We quote as follows: 4-inch water pipe, $28.50; 6 to 14 inches, $27.50; larger sizes, $26.50; gas pipe, $1 a ton higher.

Old Material.—There has been a temporary lull in the scrap material market, and the expected recession in prices is noted. The wonder is, not that this reaction has taken place, but that there have been no soft spots earlier in the advance movement. This feature makes the recent prolonged forward movement in the scrap market stand out in a very exceptional light, and now that a temporary reverse movement has set in, it is looked upon as a healthy indication, for it will remove the artificial support which the market has had, and things will settle down to a normal basis. It is not anticipated that the market is going to pieces, for the remarkable activity in other lines will soon bring about a recovery in this department. Railroads and other large holders have realized good prices on their stocks recently, and consumers have pretty well satisfied their requirements for the time being, but it is expected that inside of 30 days the old material market will have resumed its strength. The C., St. P., M. & O. had a list of 3,000 tons which closed Oct. 25; the Burlington has 3,500 tons, which is to close Oct. 27; the Rock Island, 2,000 tons, to close Oct. 28; and the Grand Trunk, 1,000 tons, to close Nov. 1.

We quote, gross tons, as follows:

Old car wheels	$18.00 to 18.50
Old iron rails	20.50 to 21.50
Rerolling rails (4 ft. and over)	18.00 to 18.50
Old steel rails (2 ft. and under)	17.50 to 18.00
Light section relayers, 45 lbs. and under subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	23.50 to 24.50
Frogs, switches and guards	16.25 to 16.75
Heavy melting steel	16.00 to 16.50
Shoveling steel	15.50 to 16.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$15.50 to 16.00
No. 2 R. R. wrought	14.50 to 15.00
Arch bars and transoms	18.00 to 18.50
Knuckles, couplers and springs	15.00 to 15.50
Shafting	17.50 to 18.00
Iron car axles	21.50 to 22.00
Steel car axles	20.50 to 21.00
Locomotive tires	17.00 to 17.50
Dealers' forge	13.25 to 13.75
Pipes and flues	12.25 to 12.50
No. 1 cast, 150 lbs. and less	15.00 to 15.50
No. 1 busheling	13.50 to 14.00
No. 2 busheling	10.00 to 10.50
No. 1 boiler cut	11.50 to 12.00
Boiler punchings	14.50 to 15.00
Cast and mixed borings	7.50 to 8.00
Machine shop turnings	11.00 to 11.50
Railroad malleable	14.75 to 15.25
Agricultural malleable	13.00 to 13.50
Stove plate and light cast scrap	12.75 to 13.25
Angle bars, splices, etc. (iron)	18.00 to 18.50
Angle bars, steel	16.00 to 16.50

CLEVELAND.

Pig Iron Strong—Heavy Specifications on Finished Material.

Office of THE IRON TRADE REVIEW,
Browning Building, Oct. 26.

Iron Ore.—The movement of ore continues very heavy, and ore shippers are having difficulty in getting enough vessels to carry their cargoes. There is a scarcity of Bessemer ore and a number of furnaces are finding it impossible to fill their requirements in this grade.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.50; Mesabi Bessemer, $4.25; old range non-Bessemer, $3.70; Mesabi non-Bessemer, $3.50.

Pig Iron.—The pig iron market is firm, although transactions are not numerous. Brokers have been endeavoring to pick up some Bessemer, but find it difficult to buy any at $19, and it is reported that a broker made a sale at $19.50 valley. Foundries are taking all the iron they can get and some requests have been received for anticipations of 1910 shipments. On No. 2 foundry, $17.50 valley is minimum, while Cleveland furnaces continue to adhere to $18 furnace for the remainder of the year and the first half of next. We quote for prompt delivery in Cleveland as follows:

No. 1 foundry	$ 18.75
No. 2 foundry	18.25
No. 3 foundry	17.75
No. 2 southern	18.85 to 19.35
Gray forge	17.40 to 17.65
Bessemer	19.90
Lake Superior charcoal	19.50 to 20.00
Jackson Co. 8 per cent silvery	20.55

Coke.—There is not much activity in the coke market, but quotations are firmly adhered to. On foundry coke, we quote for first half delivery, $3.25 to $3.50, and for prompt delivery $3.00 to $3.25. We quote Connellsville coke for prompt delivery at $2.75 to $2.90, and for first half $2.90 to $3.00.

Finished Material. — Specifications continue to be received at a very heavy rate, and some business which ordinarily would be very desirable has been returned to the buyer because it specified a greater tonnage than was provided in contracts. Contracting continues to be done in a very moderate manner. Although 1.45c is usually the lowest quotation on steel bars, that can be obtained, some business is being done at 1.40c. One explanation offered for this low price is that the seller has disposed of small tonnages at the low price in order to check the upward tendency of the market. Bar iron shows some improvement, the demand from railroads having increased, and higher prices are being obtained in Cleveland, although concessions are still being made when necessary to take business outside of the city.

Old Material.—Local mills are filled up on scrap requirements well into next year, and are refusing to quote any prices whatever. As a result, heavy melting steel has declined somewhat, $17.00 to $17.50 being asked by dealers. There are no other recessions in prices, although the material is somewhat easier in all grades of scrap. The demand for borings, turnings and cast is still holding

good. We quote gross tons, f. o. b. Cleveland, as follows.

Old iron rails	$21.00 to 21.50
Old steel rails (under 6 feet)	17.50 to 18.00
Old car wheels	18.50 to 19.00
Old steel boiler plate	15.50 to 16.00
Malleable iron (railroad)	18.00 to 18.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	16.00 to 16.50
Heavy steel	17.00 to 17.50
Country mixed steel	15.00 to 15.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$17.00 to 17.50
No. 1 busheling	14.25 to 14.75
No. 1 machine cast	15.50 to 16.00
Axle turnings	11.50 to 12.00
Machine shop turnings	11.00 to 11.50
Grate bars	12.50 to 13.00
Pipes and flues	13.50 to 14.00
Tank iron	12.50 to 13.00
Sheet iron	8.50 to 9.00
Wrought drilling	11.00 to 11.50
Stove plate	13.00 to 13.50
Cast borings	9.50 to 10.00

NEW YORK.

Heavy Buying of Pipe Iron—Advance In Ocean Freight Rates.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Oct. 26.

Iron Ore.—The situation has been featured during the week by a further advance in trans-Atlantic freights, the steamers Southfield and Mars being chartered for ore service from Spanish ports during Oct.-Nov. at 9 shillings. Furnaces in the eastern Pennsylvania district have made some small additional purchases, both of foreign and domestic ore, largely for delivery over the remainder of the year. Iron ore imports at the Philadelphia port last week aggregated almost 30,000 tons, of which over one-third came from Sagunto and a small cargo from Newfoundland.

Ferro-Alloys.—The ferro-manganese market is apparently assuming the stronger position predicted for it for some time. Advices from abroad are that the works are well sold up and are inclined to hold out for materially higher prices on future business, as desirable ores are higher and there is also an increased fuel cost. We note a recent sale of 500 tons for delivery up to July 1 at $45.00, seaboard, but the seller is now asking $46.50 for first half and $47.50 for last half, duty paid at Baltimore. One of the largest of the independent steel interests is inquiring for 1,000 tons for last half and another consumer wants 5,000 tons. Ferro-silicon is quoted nominally at $64 to $65, Pittsburg, for 50 per cent; its inactivity is puzzling in view of the generally active condition of the steel industry.

Pig Iron.—The local market has been featured by a heavy buying movement in pipe iron. The leading interest entered the market and closed for some 60,000 tons of southern and Virginia gray forge for delivery over the remainder of the year at a price not announced. The foreign iron which it has bought has not reached an important tonnage, but even if this movement should become large, heavy tonnages of domestic iron will be needed to tone down the high silicon in the Middlesboro iron. There has also been some movement in Virginia basic at full prices. The foundry trade is somewhat less active, the principal buying at present being in pipe and steel-making irons. Prices on low phosphorus iron show a considerable advance; one interest which only recently advanced from $17.00, furnace, to $18.00, is now quoting on the basis of $21.00, furnace, for 1910 delivery. Two or three vessels have been chartered in Great Britain for transporting iron to this country, but these are probably in connection with sales already reported and it is not anticipated that this movement will develop into anything large for some time. The freight rate at which the Gresham was chartered for service from the Tees to Philadelphia was 6s 9d for scrap and 5s 9d for iron. We quote, delivery at New York tidewater prior to April 1, as follows:

Northern foundry No. 1	$19.50 to 20.25
No. 2X foundry	19.00 to 19.75
No. 2 plain	18.50 to 19.25
No. 2 southern foundry	19.25 to 19.75
Malleable	19.00 to 19.50
Gray forge	17.75 to 18.25

Finished Materials.—So far as new contracts of structural materials are concerned, the present market is less active than at any time for a considerable period. The American Bridge Co. has taken 1,000 tons for the American Sugar Refining Co., at New Orleans, and will supply Snare & Triest with 500 tons for the Jay street viaduct on Staten Island. The same interest will probably secure the Chamber of Commerce at Portland, Oregon, 400 tons; it will supply 600 to 700 tons for additions to the Waverly warehouses of the Carnegie Steel Co. On an average, prices of fabricated material show a steady advance, though here and there some raggedness appears. October shop records of the leading interest will be the heaviest of the year, and this condition is quite general with other interests. The supply of raw material is coming along in much better shape. The trade is evidently going on the supposition that the present quiet constitutes the lull before the storm and every effort is being made to put the shops in the best possible shape for handling the rush of business anticipated with the new year; for this reason the present inactivity is not unwelcome.

The brisk billet inquiry for delivery over the early part of 1910 is noted, and producers which up to this time have not considered inquiries for that period are now willing to quote. For the remainder of this year the current figure is $30, eastern mills, and for the first quarter the level is considerably higher. Rail business is light. Bar iron manufacturers are rather short of orders for early delivery and are offering attractive prices, but it is expected that the expiration of low priced steel bar contracts at the end of the year will divert an important tonnage to iron. We quote:

Angles, 3 to 6 inches x ¼ inch and heavier, 1.66c to 1.86c; beams, 3 to 15 inches, 1.66c to 1.86c; tees, 3 x ¼ inch and heavier, 1.66c to 1.86c; plates, carload, tank, 1.66c to 1.86c; marine boiler, 2.06c to 2.16c; bar iron, 1.55c to 1.60c; soft steel bars, 1.56c to 1.66c; sheets, No. 28, black, 2.46c.

Cast Iron Pipe.—New York City will open bids on Friday for a total of 3,400 tons of cast iron pipe and fittings. The recent high pressure letting, 1,350 tons, has not yet reached a pipe-maker. The Lynchburg Foundry Co. has taken an order of 400 tons of gas pipe for the Brooklyn Borough Gas Co., and two or three New England interests are inquiring for considerable quantities of gas pipe for 1910. Prices show some improvement.

Old Materials.—There is no appreciable weakening in prices, although the situation is somewhat easier because of the plentiful supply of heavy melting scrap offered to Eastern Pennsylvania mills. Rolling mill and machinery cast scrap are in active demand. The ruling of the Treasury Department in regard to scrap importations will have the effect of limiting this movement very materially unless it is modified. We quote, gross tons, New York tidewater delivery, as follows:

Old steel rails (re-rolling)	17.00 to 17.50
Relaying rails	19.00 to 19.50
Old car wheels	14.50 to 15.00
Old iron car axles	22.00 to 23.00
Old steel car axles	21.00 to 21.50
Heavy melting steel	15.50 to 16.00
No. 1 railroad wrought	18.50 to 19.00
Iron track scrap	16.00 to 16.50
Wrought pipe	14.50 to 15.00
Cast borings	10 50 to 11.00
Wrought turnings	12.50 to 13.00
Heavy cast scrap	14 00 to 14 50
Railroad malleable	14 00 to 14.50
Stove plate	11.50 to 12.00
Grate bars	12.00 to 12.50

The Milwaukee Electric Light & Power Co., operating the street railway system of the city of Milwaukee, has awarded the Carnegie Steel Co. the contract for furnishing 5,500 steel wheels of the Schoen model for replacements upon its rolling stock.

CINCINNATI.

Tone of the Market Continues Strong —Prices Are Unchanged.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Oct. 26.

Pig Iron.—The sales and inquiries through this market during the past week have been insignificant, but, as Cincinnati sales agents have been represented in the large basic tonnages placed in St. Louis and some good foundry business in the east, the tone of the situation here continues strong. One St. Louis melter took 25,000 tons of basic, of which 10,000 tons was southern and 15,000 northern. The southern basic was reported as sold at $15, Birmingham, and the northern basic at from $19.75 to $20, delivered, St. Louis. Another St. Louis melter bought 10,000 tons of southern basic, and a further sale of 5,000 tons was reported at $15, Birmingham. An eastern melter took 1,000 tons of Virginia basic, and a sale of 1,500 tons of Virginia basic was reported to a local steel mill. A large foundry interest bought 2,500 tons of foundry iron for first quarter delivery for eastern shipment. These were the principal transactions mentioned in the market. A sale of 300 tons of charcoal iron to a Pittsburg concern was made on the basis of $22.00, Birmingham. The leading cast iron pipe interest is reported to have made some extensive purchases with the tonnage estimated at from 15,000 to 25,000. The price basis remains unchanged and for delivery over the remainder of the year some southern iron is obtainable at $14.50, Birmingham, although a number of the furnaces are maintaining $15.00 as a basis. In this connection it is probably easier to buy No. 2 foundry at $14.50, Birmingham, than lower grades at the usual differences, as low grades are and have been scarce. But few transactions in northern iron have been reported and the inquiry is meager. In the Ironton district, No. 2 foundry is quotable at $17.00 at furnace for prompt shipment and at $17.50 for first half of next year. Southern iron for first quarter delivery is firm at $15.00, Birmirgham, and several furnaces are now willing to take business through the full half at $15.00. There is some irregularity in quotations for high silicon and Jackson county 8 per cent, while nominally quotable at $19.00 at furnace, could probably be shaded. We quote for prompt shipment and for delivery over the remainder of the year delivered Cincinnati, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, as follows:

Southern foundry No. 1	$18.25 to 18.75
Southern foundry No. 2	17.75 to 18.25
Southern foundry No. 3	17.25 to 17.75
Southern foundry No. 4	16.75 to 17.25
Southern No. 1 soft	18.25 to 18.75
Southern No. 2 soft	17.75 to 18.25
Southern gray forge	16.75 to 17.00
Northern No. 1 foundry	18 70 to 19.20
Northern No. 2 foundry	18.20 to 18.70
Northern No. 3 foundry	17.70 to 18.20
Jackson county 6 per cent silicon	19.20
Jackson county 8 per cent silicon	20.20
Jackson county 10 per cent silicon	21.20

Finished Material.—The market continues strong with mills continuing to get farther behind in their deliveries. Business for next year is being taken in steel bars at from $1.45 to $1.55, Pittsburg. On some specifications the mills are 20 weeks behind on deliveries, but consumers are apparently becoming more accustomed to the situation and there is less friction between the mills and customers. Jobbers' stocks are naturally depleted and they are making every effort to replenish their line.

Coke.—The situation shows but little change. Prices are firm and there is a continued demand for prompt shipment coke, although this class of demand is not so urgent as in the recent past. Furnace contracts continue to be made on the basis of $1.60 for coke against $9.00, Birmingham, for pig iron with a sliding scale advance of 16 2/3 per cent for any advance in pig iron over $9.00.

	Prompt shipment.	Remainder of year.	First half 1910.
Connellsville district:			
Fdy. coke.	$3.00 to 3.25	$3.15 to 3.25	$3.25 to 3.50
Fur. coke.	2.85 to 3.00	2.85 to 3.00	2.90 to 3.10
Wise county district:			
Fdy. coke.	2.75	2.75	3.00 to 3.50
Fur. coke.	2.25 to 2.35	2.25 to 2.35	2.35 to 2.50
Pocahontas district:			
Fdy. coke.	2.75	2.50	2.75 to 3.00
Fur. coke.	2.50	2.50	2.50 to 2.75

Old Material.—The market is rather quiet and somewhat unsettled. Steel scrap is firmly held, but demand is a little less urgent. Some dealers are not inclined to accumulate scrap at present prices. Dealers' prices covering profit and cost of preparation are as follows:

Old No. 1 R. R. wrought, net tons	$14.50 to 15.00
No. 1 machinery, net tons	14.50 to 15.00
No. 1 busheling, net tons	14.00 to 14.50
Old iron rails, gross tons	18.50 to 19.00
Old steel rails (re-rolling) gross tons	17.50 to 18.00
Old short lengths, gross tons	16.00 to 17.00
Old iron axles, net tons	19.00 to 19.50
Heavy melting scrap, gross tons	15.00 to 15.50
Stove plate, net tons	11.00 to 11.50
Heavy turnings, net	9.50 to 10 00
Cast borings, net tons	8 25 to 8.75
Car wheels	15.50 to 16.00

The Butte Coalition Mining Co. has declared a quarterly dividend of 25 cents a share, payable Dec. 1. No dividends have been paid on this stock since December, 1907, when the rate was reduced to 15 cents. The dividend was omitted in March, 1908.

PHILADELPHIA.

Basic Price Advances—Purchase of Low Phos Iron.

Oct. 26.

Pig Iron.—The week has been featured by a continuance of the brisk buying movement, particularly of basic, low phosphorus and pipe-making irons, by the advance of basic to a minimum of $19, delivered, for any shipment to April 1, by the enforced blowing out of a large merchant stack and by other developments of an equally bullish nature. One of the two Swede furnaces has gone out of blast for relining, which means that it will be out of operation almost to Jan. 1. As its withdrawal from activity was unexpected and its output has been sold practically full for the last quarter, this had the immediate effect of strengthening the market, which, already buoyant because of sales made last week at $18.50, $18.60 and $18.75, delivered, immediately advanced to a minimum of $19 for any iron available over the remainder of this year and the first quarter. Even that figure is so near what it is now certain 1910 production costs will be, that the furnace nearing completion for an independent steel works will probably not operate unless there is a further substantial advance. Basic sales have been rather light during the week, though including one lot of Virginia iron on a $16, furnace, basis. A furnace interest in this district has taken the Standard Steel Works business, 18,000 tons of low phosphorus iron for April-December shipment, at a price not announced. Other small lots of low phosphorus iron have been made on a basis of $22.50, delivered at eastern Pennsylvania plant, and producers are not pushing it at this figure. Pipe works, particularly in Virginia, have bought heavily for the first quarter, and the usual movement of foundry iron in small lots is continued. The meeting of the Eastern Pig Iron Association, held last week, showed orders on books practically the same as a month previous, but stocks had decreased almost 15,000 tons and were at a negligible figure. Thirty-two stacks were reported in operation and 11 out; during the month one Warwick stack had blown in and the Swede furnace, noted above, had gone out. The Maryland Steel Co. has put out one of its four Sparrows Point furnaces; opportunity will be taken to reline it while its output is not needed. The Tidewater furnace will probably become operative with-

in a short time. We quote, delivery prices at eastern Pennsylvania plants up to Apr. 1, as follows:

No. 1X foundry	$19.50 to 20.25
No. 2X foundry	19.00 to 19.75
No. 2 plain	18.50 to 19.25
Standard gray forge	18.00 to 18.50
Basic	19.00 to 19.50
Low phosphorus	22.50
No. 2 Birmingham	19.50 to 20.00
No. 2X Virginia	19.00 to 19.50
No. 2 plain Virginia	18.50 to 19.00

Finished Materials.—The structural market shows some improvement, both as to volume of business and prices on fabricated work. Early decisions are anticipated on a 600-ton store and office building at Easton, Pa., and on the Fidelity building at Baltimore, 2,600 tons; while the steel is yet to be placed on a school building at Washington, 150 tons; on the McCall school, in this city, and a high school at Norfolk, both $250,000 propositions; on the Harriet Lane home in Baltimore, 500 tons, and on three naval hospitals, aggregating 1,000 tons, the contract for which has gone to the Provident Iron & Steel Co. The Bethlehem Steel Co. will supply 3,000 tons for Michigan Central train sheds at Detroit, 500 tons for the Lacy office building and 600 tons for the Woodward apartment house, both in Washington, and 350 tons for the Grundy spinning mill at Bristol. Billets are in better demand and are commanding increased premiums for early delivery. The plate situation is unchanged. We quote, Philadelphia delivery, as follows: Structural shapes and plates, 1.65c to 1.85c; steel bars, 1.60c to 1.70c; sheets, No. 18 to 20, 2.50c; refined bar iron, 1.55c to 1.65c.

Old Materials.—Heavy melting steel scrap is easier, though prices show no material change. The associated mills have been securing such ample supplies that shipments have been diverted to Coatesville from Bethlehem and Steelton, where embargoes were threatened. Arrivals at Pottsville have also been heavier than could be handled comfortably. This condition results from the release of large tonnages carried for a considerable period against the market reaching the $18 level and from the arrival of considerable scrap from Great Britain, Galveston, New Orleans, San Francisco and other unusual sources of supply. The steamer Acme, now at New York, will be brought here to unload 3,000 tons of San Francisco scrap. Importers are meeting with customs difficulties, the controversy over the Winnie cargo of crop ends being reported elsewhere in this issue. The cargo of the steamer Falkenback, recently arrived from Galveston, is also involved in litigation. Wrought pipe is lower, because of the largest consumer lowering its price, though another has entered the market and bought heavily. We quote, gross tons, delivered at eastern Pennsylvania plants, as follows:

Old steel rails (rerolling)	$19.25 to 19.75
No. 1 steel scrap	18.00 to 18.50
Old steel axles	23.50 to 24.50
Old iron axles	28.00 to 29.00
Old iron rails	21.00 to 22.00
Old car wheels	17.50 to 18.00
Choice scrap R. R. No. 1 wrought.	21.00 to 21.50
No. 1 yard scrap	19.00 to 19.50
Machinery scrap	17.00 to 17.50
Low phosphorus scrap	22.00 to 22.50
Wrought iron pipe	17.25 to 17.75
No. 1 forge fire scrap	16.50 to 17.00
No. 2 forge fire scrap, ordinary.	9.50 to 10.00
Wrought turnings	15.50 to 16.00
Axle turnings, heavy	16.50 to 17.00
Cast borings	13.50 to 14.00
Stove plate	14.50 to 15.00

BUFFALO.

Market for Pig Iron Less Active—Basic Prices Are Higher.

Office of THE IRON TRADE REVIEW,
932 Ellicott Square, Oct. 26.

Pig Iron.—Buyers have been less active the past week, making a quiet market, but without material change in quotations, with a few exceptions, and there have been no closings for heavy tonnage reported, although several such negotiations are pending. There is no downward tendency in prices and quotations previously made are likely to stand for a time. There appears a tendency toward a smaller spread between minimum and maximum prices on the various grades of foundry iron, but in no case is the difference greater than 25c a ton. The basic market represents a most unusual condition and we find it necessary to quote $17.75 to $18.25, Buffalo, instead of $17.25 to $17.50, which is an increase in the minimum price of 50c a ton. The demand for basic is very strong. In this connection it became known today that the Wickwire Steel Co. would supplement its present furnace capacity by an additional furnace and steps toward that end have already been taken. There are unconfirmed rumors of other projects along a similar line in this district. More inquiries are coming in from the foundry interests for first half of 1910; in fact, the interest in that period is much greater now than in tonnage needs for the balance of 1909. The tone of Southern foundry grades is improving from the dealers' standpoint, the demand being stronger at firm prices. For Birmingham $14.50, furnace, is asked for the remainder of the year. Inquiry for 1910 first half Southern is decidedly stronger, the price being $15, Birmingham. Freight from Birmingham to Buffalo is $4.90. Selling is largely in small tonnages, averaging 250-ton lots.

For delivery during the balance of the year, we quote, f. o. b. Buffalo, as follows:

No. 1X foundry	$17.25 to 17.75
No. 2X foundry	16.75 to 17.25
No. 2 plain	16.75 to 17.00
No. 3 foundry	16.25 to 16.50
Gray forge	16.00 to 16.50
Malleable Bessemer	17.25 to 18.25
Basic	17.75 to 18.25
Charcoal	20.00 to 21.00

Finished Material.—Specifications on contract tonnage are exceptionally strong at this point and buyers are pressing the mill interests very hard for deliveries, but it is difficult for the consumers to gain any concessions in this respect. So far as new business is concerned, the market is very quiet. Only a few notable building projects are up. The Flickinger building, Buffalo, will require 400 tons on which the American Bridge Co. is the lowest bidder. Owing to the uncertainty of deliveries, the contract has not been let. There are a number of school building projects under way which will require steel. Plans are out for a new court house at Belmont, N. Y., in which structural and ornamental iron will be used. Specifications are out on a 13-story addition to Statler's Hotel, Swan and Washington streets. Plans call for fabricated structural and architectural iron.

Old Material.—The market is in a healthy condition, and large tonnage is going out on contracts recently made. Like the pig and finished material market, the demand for old material is quiet here at present with no change in values. There is a good call for heavy melting steel, in which the biggest business is usually done at this point. The tendency of the market seems to be toward early deliveries on most requirements and consumers are showing a very active interest in tonnage for the early part of 1910.

We quote the following prices on gross tons, f. o. b., Buffalo:

Heavy melting steel	$16.50 to 17.00
No. 1 railroad wrought scrap	18.25 to 18.75
No. 1 railroad and machine cast scrap	16.50 to 17.00
Old steel axles	21.00 to 21.50
Iron axles	26.00 to 26.50
Car wheels	19.00 to 19.50
Railroad malleable scrap	17.00 to 17.50
Machine shop turnings	12.00 to 12.50
Cast iron borings	9.50 to 10.00
Low phosphorus steel scrap	21.00 to 22.00
Old iron rails	20.00 to 21.00
Tank iron	14.00 to 14.50
Sheet iron	9.00 to 9.50
Stove plate	14.00 to 14.50
Pipe and flues	14.00 to 14.50
Grate bars	13.00 to 13.50
Boiler plate	15.50 to 16.00

The citizens of Goderich, Ont., have adopted a by-law guaranteeing the bonds of the Good Road Machine Co. for $40,000.

ST. LOUIS.

Heavy Buying of Basic—Still Some Foundry Iron at $14.50.

Oct. 25.

Pig Iron.—There was considerable activity in the pig iron market in the St. Louis territory last week, resulting in the purchase of 15,000 tons of Northern basic and 20,000 tons of Southern basic by the Scullin-Gallagher Iron & Steel Co. for delivery over the remainder of this year and the first half of next year, and other sales including 10,000 tons taken by the American Steel Foundries.

Orders came in quite freely today for small tonnages for prompt and future shipment. One of the largest Southern foundries contracted for about 2,400 tons for delivery over the first half of 1910. Occasionally one heard of inquiries for quotations for third quarter delivery in 1910, but it is doubtful if there is any basic available so far in advance. There is undoubtedly some $14.50 foundry iron to be had in the St. Louis territory, Birmingham basis, but it seems to be equally certain that all of it is resale iron, and that the minimum quotation for this grade is $15. Some local dealers, however, insist that a price of $14.50 can be made for spot shipment. The Southern furnaces do not seem to be very anxious to sell, being satisfied, apparently, with what business is coming their way, and some few furnaces are demanding $15.50 for shipment over the second quarter of next year. Ohio strong foundry iron is quite firm at $17, Ironton. Our prices for Southern iron delivered, to which the freight of $3.75 from Birmingham has been added, follows:

No. 1 southern	$18.75 to 19.25
No. 2 southern	18.25 to 18.75
No. 3 southern	17.75 to 18.25
No. 4 southern	17.25 to 17.75

Coke.—The market is considered strong for coke, a little spot Connellsville foundry can be had at $3 and $3.25, ovens, for delivery up to January 1. On contract for first quarter and first half delivery a price of $3.25 to $3.50 is easily obtained, f. o. b. ovens. Connellsville 48-hour furnace coke is bringing $2.75 a ton, ovens, for prompt, and $2.75 to $3.25 for contract shipments. The price on Virginia 72-hour foundry coke for prompt and future delivery is $3 to $3.25; Virginia 48-hour furnace on contracts, $2.75 to $3. The freight on coke to East St. Louis and St. Louis is $2.80, and $2.70 when shipment is consigned beyond St. Louis. By-product coke is a little off in price, and is bringing $5.75, delivered.

Finished Material.—Plans are underway for three new skyscrapers in St. Louis, which if they mature, will entail an outlay of $1,800,000 exclusive of the building sites.

Old Material.—The market is about at a standstill for scrap iron, with quotations remaining as follows:

Cast iron borings, free from foreign material, net tons	$ 6.00 to 6.50
Steel axle turnings, gross tons	11.00 to 12.00
Steel railroad axles, net tons	19.50 to 20.00
Iron railroad axles, net tons	22.00 to 23.00
Miscellaneous steel scrap, gross tons	11.00 to 12.00
Old car wheels, gross tons	17.50 to 18.50
No. 1 railroad cast scrap, net tons	12.50 to 13.50
Heavy machinery cast, net tons	14.50 to 15.00
Stove plate and light cast, net tons	10.00 to 11.00
Sheet iron, net tons, uncut	5.00 to 5.50
No. 1 railroad wrought, net tons	13.50 to 14.00
Railroad malleable, net tons	13.00 to 13.50
Heavy melting steel, net tons	13.00 to 14.00
Relaying rails, net tons	18.00 to 19.00
Extra heavy cast, requiring breaking	11.50 to 12.50
Railroad grate bars (eng)	10.50 to 11.00

BIRMINGHAM.

Principal Iron Dealers Have Opened Books for First Half of Next Year.

Birmingham, Ala., Oct. 25.

Pig Iron.—There has been no change in the base price of pig iron during the week just passed, though it is somewhat firmer; the tendency being to make $15.00, 2 Foundry base, per ton at the furnace applicable for any delivery including the first half of 1910. The principal iron dealers have opened their books for the first half of next year, though there are some who still insist on selling second quarter iron only in connection with the first quarter business. During the past week some few thousand tons of iron were booked for next year delivery on base price of $15.00 per ton at the furnace. Inquiries for iron are still good, considering the circumstances. A large tonnage is moving from the yards of the different companies in the district; and where the movement has been light it has been occasioned by a shortage in car supply. The demand for charcoal iron is comparatively good; and today the price of Southern charcoal iron is $21.50 per ton, with a strong tendency toward $22.00 at an early date.

Cast Iron Pipe.—The manufacturers of cast iron pipe report sufficient orders on their books to keep them running full time; and prospects immediately ahead for very satisfactory business next year. The unsettled condition as to the pig market has been instrumental in preventing the making of contracts for 1910. Indications, from different parts of the country, point to large improvement work to be done by municipalities. These specifications are coming up from time to time for consideration. Prices are reported very firm, with a tendency to an advance shortly, and are as follows, f. o. b. cars at the foundry here: 4-inch, $25; 6-inch, 8-inch and 10-inch, $23; 12-inch and over $22, average, with a dollar a ton advance for gas pipe.

Scrap Iron.—The demand for scrap iron holds up well, especially for good machinery cast. The demand for heavy remelt steel scrap has fallen off to a certain extent.

BRITISH IRON MARKET.

Pig Iron Stocks Increase and Prices Fluctuate—Quarterly Meeting.

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, England, Oct. 16.

The quarterly meetings have been held this week, and have assisted a judgment as to the state of trade. In the northern district there has been some fluctuation. At the beginning of the week, prices dropped from 52s 8d ($12.88) to 51s 3½d ($12.55). This was partly owing to slightly less cheerful reports from America, but mainly owing to the great rate at which stocks are increasing. They have grown since the beginning of the month by 13,369 tons, and now stand at 328,556 tons. Prices have recovered to 51s 10½d ($12.69), and show signs of being maintained, but the expected big orders from America have not arrived, and trans-Atlantic business is mainly for scrap steel, of which large quantities have been sent. The total exports to all countries since the beginning of the month have been 50,607 tons, compared with 40,377 tons last month and 44,018 tons for the same period last year.

It is noteworthy that in the Midland district this fluctuation has not been shared.

The hematite business continues very steady with prices unchanged, and the better outlook for steel is keeping this market firm.

Finished Materials.—The quarterly meeting was well attended with an unusually large contingent from South Wales, where the tin mills are working at high pressure, and are safe for business well in to the new year. A meeting of the Tinned Sheet Association resulted merely in the confirmation of recent prices. The inquiries suggested a fair amount of foreign business. The Strip Association held a meeting, but did not alter prices. In most finished

departments a fair output is maintained, and sheets in particular are active, but the heavy purchases made at the favorable moment, which followed the collapse of the association, has so far satisfied consumers that new contracts are not yet urgent, and the sheets made at present are mostly at the very low minimum prices of a couple of months ago. Steelmakers are well booked at recent figures. But the comparative stagnation in the structural department is still a subject of serious complaint, and for such business as is passing, structural engineers complain that while they have to pay the 5 shillings recently added to the price of steel, they are quite unable to include this in any quotation, and in fact have practically to pay this out of their own pockets. Some good business has been done in billets, especially of high quality. There were some rumors of Belgian offers of material at 90s to 92s 6d, but this is so near to the British prices as to make the offer, in view of quality, deliveries, etc., scarcely worth entertaining.

There are great complaints at Sheffield over shortness of work. The orders for battleships have not made any great difference to the local ship building yards. Such orders are described as merely a drop in a bucket, and a more serious trouble is still the marked absence of orders for railway steel and for heavy castings and forgings. For such wagon building orders as are being executed a good deal of foreign material is being imported.

Increasing inconvenience is felt through the continued strike in Sweden which is making certain brands of steel practically impossible to obtain.

METAL MARKETS.

ST. LOUIS.

Oct. 25.

Lead and Zinc.—A shortage of cars in the Missouri-Kansas-Oklahoma district sent blende up $1 last week, the base price for 60 per cent ore being $50.50 as compared with $49.50 for the preceding week. The top price reached was $53 for 60 per cent ores.

Calamine, or silicate of zinc, was proportionately strong, the price for 40 per cent ore ranging from $25 a ton for small lots to $28 for larger ones.

Lead ore remained at $55 base for 80 per cent ore. One company was active in the field, and a big clean-up was made, but the demand was not generally strong. St. Louis pig lead was unchanged Saturday, remaining at $4.27½.

The car shortage probably was felt more keenly in the Joplin camp than elsewhere. Webb City, the largest producing camp in the district, was not seriously affected by a lack of cars, but it is admitted that shipments from there would have been much heavier if transportation facilities had been favorable.

It is believed that the smelters anticipate higher prices and are laying in all of the zinc ore obtainable before the increase comes. The surplus of zinc ore in the district is still heavy, and a higher price will be needed to clean up the bins. St. Louis spelter was strong Saturday at $6.25 to $6.27½, and it begins to look as if ore prices might reach an altitude that will cause the bins to dwindle.

NEW YORK.

Oct. 26.

Copper.—The statistical position of the market is in such shape that consumers in this country, although enjoying very fair business, are contented to cover their needs from hand to mouth and to operate on relatively small stocks. What business is current is largely for European delivery and is done at slight concessions from the prices which have prevailed for domestic shipment. For the latter a moderate amount of Lake has sold at about 13c and electrolytic is available at as low as 12⅝c. We quote as follows: Lake, 12⅝c to 13c; electrolytic, 12⅝c to 12⅞c; casting, 12½c to 12⅝c. The British market is decidedly easier.

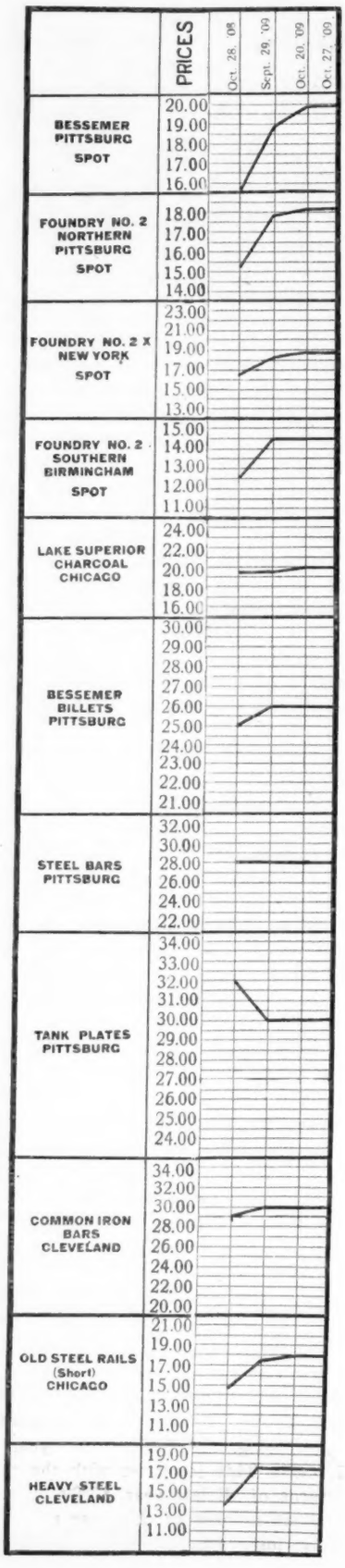
Pig Tin.—The situation shows little change, although the foreign market has taken on a stronger tone and there is evidence that consumption in this country is showing a steady increase. Current business is on the basis of 30½c to 30¾c.

Pig Lead.—In a quiet and featureless market the selling price continues at 4.30c to 4.35c, New York. The London market is steady and fluctuates between narrow limits.

Spelter.—The position of this metal is now extremely strong. The demand for galvanizing and brass making shows a steady increase and buying has been remarkably heavy. Smelters are sold well ahead and the price level has been steadily advanced, being now between 6.40c and 6.50c, New York. The base price of sheet zinc has been returned to 8c per ton, f. o. b., Illinois points.

Antimony.—On a stronger market we quote Cookson's at 8⅜c to 8½c; Hallett's at 8¼c to 8⅜c; and outside brands at 7⅝c to 8c. Stocks have been largely cleared out.

PRICE CHART.



ROCHESTER EXPOSITION

Was Notable Achievement—Machinery Men Well Represented.

The Rochester, N. Y., industrial exposition closed Oct. 23, after twelve days of achievement for Rochester manufacturers. The chamber of commerce directed the exposition, which was the second annual event. Space sold to exhibitors brought $18,600 and nearly as many manufacturers could not secure space as were represented.

Machinery manufacturers, and concerns engaged in the iron and steel business of Rochester were the most notable exhibitors. It is intended to repeat the event on a much larger scale another year. The show netted about $25,000.

AMERICAN ELECTROCHEMICAL SOCIETY MEETING.

The autumn meeting of the American Electrochemical Society will be held in New York City from Oct. 28 to 30. The convention will be opened by a professional meeting in the Chemists' Club, Thursday afternoon. Besides a number of papers to be presented and discussed there will be a general experimental lecture by Prof. Edgar F. Smith, of the University of Pennsylvania, on recent developments in electro-analysis. An interesting social program, including a banquet Friday night, has been arranged.

On Saturday morning and afternoon, two sessions devoted to the reading and discussion of papers will be held at Columbia University. The whole Friday will be devoted to an excursion to Bayonne, N. J.

NO IDLE STEEL PLANT.

The starting up of the United States Steel Corporation's steel works at Columbus, O., leaves that interest without an idle steel plant. The Columbus works operate entirely on sheet bars and have a monthly capacity of 13,000 tons. One of the big Gary furnaces will be blown in about Nov. 1, and another perhaps ten days later. Each has a rated monthly capacity of 13,500 tons.

PNEUMATIC TOOL EARNINGS.

In a statement made in Chicago for the purpose of having its stock listed, the Chicago Pneumatic Tool Co. shows profits for eight months up to Aug. 31 of the fiscal year of $276,335. This compares with the total returns of all last year, $289,625. The first six months of this year the company just paid its way, the largest share of the profits being made in July and August. President O. W. Duntley is quoted as saying that by the end of December $200,000 will be available for dividends which the company will likely resume paying early next year.

FOR MOTOR FLY WHEELS.

An interesting contract in the iron and steel industry is that given by the Thomas Motor Car Co., of Buffalo, to the Carnegie Steel Co., for furnishing a number of steel wheels to be used as fly wheels of the engines of the cars. The wheels will be manufactured by the recently-perfected Slick process for which the company has made manufacturing arrangements at its Homestead plant. A number of the latest models of the Thomas car will be equipped in this manner.

GERMANY'S PRODUCTION.

The September production of German iron and steel, as reported by the Association of German Iron and Steel Manufacturers, was 1,068,345 tons, comparing with 1,100,671 tons the previous month and 928,729 tons in Septemebr, 1908. This production was distributed as follows: Foundry pig iron, 211,781 tons; Bessemer pig iron, 33,962 tons; Thomas pig iron, 684,305 tons; steel and spiegel iron, 93,983 tons; puddling pig iron, 44,314 tons.

FOREIGN RAIL MARKET.

The foreign rail market is relatively quiet. Norway is in the market for 8,300 tons of various sections and a fair inquiry is pending in Great Britain. Advices from abroad are that the Argentine order, secured by the United States Steel Corporation some time ago, has been increased to 75,000 tons, and that this interest recently secured about 14,000 tons for West Australia.

DYNAMITE ACCIDENT.

Supt. Mark Steese, of the Mary stack of the Ohio Iron & Steel Co., Lowellville, O., together with four other persons, was injured by an explosion of dynamite, Oct. 23. The explosion occurred while the men were standing near the storehouse. It is not known what caused the explosion, as no one was working with the dynamite at the time. All the victims will recover.

The Kearney & Trecker Co., West Allis, Wis., builders of milling machinery, plans to triple the capacity of its plant by erecting a new building 179 by 260 feet, to cost $100,000.

SAN FRANCISCO NEWS NOTES.

San Francisco, Oct. 23.—A nice government job has just been finished by Adam Schilling & Sons' machine shop, which secured an order in open competition for two indicators to be used in the giant guns recently installed on Pearl Harbor, Honolulu, Hawaiian Islands. These indicators are the first two of many to be made for the big guns along the coast and will be used for indicating the range, elevations and scores.

The United Engineering Works, of this city, has completed the new patrol and fire boat Phoenix to be used on the Oakland estuary by the Alaska Packers' Association, which has a warehouse and a fleet of merchant ships, always in the harbor, to protect. It is made along similar lines to the new fire boats for the city and is a credit to the boat building industry of San Francisco and vicinity. Two 50-horsepower distillate running gas engines are to be installed in the boat by the Atlas Gas Engine Co., of this city.

Murray Brothers Machine Works is also just finishing a hoisting engine for the Western Pacific to be used for pile driving purposes on its new ferry boat pier in San Francisco Bay. The engine is one similar to those this company made and is making for the Southern Pacific. It is a double drum hoist and has a 50 per cent discharge and greater working capacity than any other special hoisting engine made. The engine was patented by W. R. Murray.

BARYTA TRACT PURCHASED.

St. Louis, Oct. 25.—The Mercantile Trust Co. of this city closed the sale Saturday of a large and valuable mineral tract in Washington county, Mo., consisting of about 23,000 acres, and known as the American lead and baryta property, near Potosi. The sale was made for the Nina Realty Co., a holding corporation of the Missouri-Lincoln Trust Co., at a consideration of $385,000. The purchaser was Edwin M. White of South Yarmouth, Mass. Mr. White associated with him in the purchase C. G. Norris of Boston. It is understood that it is their intention to greatly improve and develop the property.

The United States Metals Refining Co. has purchased 12 acres adjoining its works at Carteret, N. J., for refining copper by the electrolytic method. Upon this site it is proposed to build a plant for refining lead.

HIGHER DIVIDEND RATE

DECLARED BY UNITED STATES STEEL CORPORATION ON COMMON.

Net Earnings for Quarter Show Gain of Nearly $9,000,000—Unfilled Orders on Books Have Increased Over 700,000 Tons Since Previous Quarter.

The United States Steel Corporation's report for the third quarter ending Sept. 30 was made public Tuesday afternoon. The net earnings were $38,246,907 and the unfilled orders were placed at 4,796,833 tons. A quarterly dividend of 1 per cent was declared on the common stock, thus increasing the dividend one fourth of 1 per cent from that of the last declaration in July, which was three fourths of 1 per cent. The usual 1¾ per cent on the preferred stock was also declared.

The net earnings, $38,246,907, compare with $29,340,491 for the quarter ending June 30; $22,921,268 on March 31; $26,246,674 on Dec. 31, 1908; and $27,106,274 on Sept. 30, 1908.

The surplus for the quarter ending Sept. 30 last, after deducting all interest and sinking fund charges and preferred and common dividends, was $2,155,113 against $5,894,244 on June 30; $3,926,674 on March 31; $5,142,454 on Dec. 31, 1908; and $5,152,023 on Sept. 30, 1908.

The unfilled orders on hand on Sept. 30 last amounted to 4,796,833 tons against 4,057,939 tons on June 30; 3,549,595 tons on March 31; 3,603,527 tons on Dec. 31, 1908; and 3,421,977 tons on Sept. 30, 1908.

The following table gives the net earnings and comparisons:

NET EARNINGS AND COMPARISONS.

	1909.	1908.	1907.
July	$ 12,530,770	$ 8,599,630	$ 13,804,169
August	12,437,754	9,152,311	15,279,173
September	13,278,383	9,354,333	14,720,945
Third quarter	$ 38,246,907	$ 27,106,274	$ 43,804,285
January	$ 7,262,695	$ 5,052,743	$ 12,838,703
February	7,669,336	5,709,423	12,145,815
March	7,989,327	7,466,834	14,137,974
First quarter	$ 22,921,268	$ 18,229,095	$ 39,122,492
April	$ 8,163,244	$ 6,761,680	$ 14,600,838
May	9,661,228	6,021,279	16,056,832
June	11,516,019	7,482,797	14,846,035
Second quarter	$ 29,340,491	$ 20,265,756	$ 45,503,705
Total for three quarters	$ 90,508,666	$ 65,601,035	$128,430,482

The following is a comparison in detail of the financial results for the quarter ending Sept. 30 with comparisons:

THE QUARTER'S FINANCIAL RESULTS.

	Sept. 30, 1909.	June 30, 1909.	Sept. 30, 1908.
Net earnings	$ 38,246,907	$ 29,340,491	$ 27,106,274
Sinking fund for subsidiary companies	$ 506,717	$ 506,096	$ 436,675
Depreciation and reserve	6,885,171	5,511,000	5,359,857
Total	$ 7,391,888	$ 6,017,096	$ 5,795,857
Balance	$ 30,855,019	$ 23,323,395	$ 21,310,417
Interest on bonds	$ 1,426,062	$ 1,400,101	$ 1,363,153
Total	$ 7,311,962	$ 7,311,963	$ 7,311,982
Available for dividends	$ 23,543,057	$ 16,011,432	$ 13,998,435
Preferred dividend	6,304,919	6,304,919	6,304,919
Balance for common	$ 17,238,138	$ 9,706,513	$ 7,693,536
Common dividend	5,083,025	3,812,269	2,541,513
Surplus	$ 12,155,113	$ 5,894,244	$ 5,152,023
Additions and betterments	10,000,000	.....	.....
Surplus	$ 2,155,113	$ 5,894,244	$ 5,152,023

OPERATIONS FOR NINE MONTHS.

	1909.	1908.	1907.
Net earnings	$ 90,508,666	$ 65,601,035	$128,430,482
Deductions	39,081,071	33,706,256	38,797,819
Available for dividends	$ 51,427,595	$ 31,894,779	$ 89,632,663
Preferred dividends	18,914,757	18,914,757	18,914,757
Available for common dividends	$ 32,512,838	$ 12,980,022	$ 79,717,906
Common dividends	11,436,807	7,624,539	7,624,539
Surplus	$ 21,076,031	$ 5,355,483	$ 63,093,367
Special funds, etc.	10,000,000	.....	51,000,000
Final surplus	$ 11,076,031	$ 5,355,483	$ 12,093,367
Previous surplus	133,415,214	122,645,244	97,720,714
Total surplus	$144,491,245	$128,000,727	$109,814,081

UNFILLED ORDERS IN TONS.

	1909.	1908.	1907.
Dec. 31	.....	3,603,527	4,624,553
Sept. 30	4,796,833	3,421,977	6,425,000
June 30	4,057,969	3,313,876	7,603,878
Mar. 31	3,542,595	3,765,343	8,043,058

The preferred dividend is payable Nov. 30. Books close Nov. 5 and reopen Dec. 1. The common dividend is payable Dec. 30. Books close Dec. 10 and reopen Dec. 31.

The Mansfield Steel & Wire Co., Mansfield, O., which was recently incorporated for the purpose of manufacturing automatic drive gates, is occupying the building formerly used by the Mansfield Boiler & Tank Works. At a recent meeting, the following officers and directors were elected: President, Huntington Brown; vice president, Arthur Hughes; general manager, secretary and treasurer, A. Kallmerton; superintendent, M. A. Blackburn; Peter Bittinger.

PANAMA SCRAP

Will Probably be Sold in Special Lots by the Government.

The prospect is that the final decision of the government with respect to the disposition of the scrap iron and steel accumulations on the Panama canal zone will be to make sales of such accumulations from time to time, upon bids for such special lots as may be ready for the market. This course has not been generally decided upon, but it is probable that such will be the decision. The government officials were not satisfied with the bids recently received, which were intended to cover all scrap accumulations for a period of at least a year, and to be taken as the lots of scrap appeared. This plan having brought bids which were regarded by the officials as undesirable, it is now considered as certain that bids will be asked for only upon such lots of scrap as the canal company officials may deem desirable to dispose of at any particular time. No intimations are given as to when new bids may be invited.

GREAT PROSPERITY

Being Enjoyed by Lake Vessels—Not Enough Vessels for Ore and Grain.

The lake trade is enjoying a period of old time prosperity. Not for several years have the closing months been marked with the scrambling for tonnage that now exists. The vessel owner is now the autocrat who sits back in his arm chair and lets the shipper come to him. In fact, ore shippers and grain shippers would be glad to get vessel tonnage and some of them are worrying, fearful that the winter may close in before they get all their freight moved. The grain rate has been advanced to 2½ cents, which is equivalent to 93 cents on ore. Few vessel owners can take advantage of it, however, as nearly all of them are behind on their contract ore movement. It is for that reason also that no advance has taken place in the ore rate, though on a few cargoes for small interests a premium of ten cents has been paid from Marquette.

Stages of water are very low and the large carriers are carrying several hundred tons less per trip, making heavy inroads into earnings. Ore figures for October are not yet available, but the movement will be considerably less than during September, owing to weather conditions.

Exact data relative to the loading of the steamer William E. Corey in 39 minutes at Two Harbors on Oct. 10, is now at hand. The cargo had all been arranged for before hand, 9,311 gross tons of Pioneer ore having been placed in 33 pockets of the new steel ore dock, these pockets corresponding to the 33 hatches of the steamer Corey, and the balance of 800 tons held in Summers ore cars over the pockets. The loading commenced at 2:17 p. m. and by 2:56 p. m. the 10,111 gross tons (mine weight) had been poured into her hold and the chutes raised to the dock. It required but 24 minutes to run the 9,311 tons of ore that the pockets contained and the remaining time of 15 minutes was required in dumping 800 tons, or 18 cars. It will be noted that the Corey did not have to shift.

ANNUAL INDUSTRIAL EXCURSION.

The Cincinnati Industrial Bureau gave its annual industrial excursion Oct. 26. The route was over the terminals of the Norfolk & Western Ry., which furnished a special train. The plants inspected were the Baldwin Piano Co., The Pfau Mfg. Co., The Rebhun Last Co., and the Blackburn Varnish Co. About 100 business men and prominent manufacturers made the trip. The Industrial Bureau is an organization supported by the Cincinnati business interests, which has for its object the securing of locations and for inducing new industries to locate in Cincinnati. The bureau has been in successful operation for about seven years.

WAVERLY WAREHOUSES ENLARGED.

Carnegie Steel Co. Begins Important Additions to Storage Buildings.

The Carnegie Steel Co. has broken ground for important additions to its Waverly warehouses, and construction work will be rushed to insure their completion before severe winter weather sets in. The bar warehouse will be increased by an addition, 63 by 500 feet, and the main warehouse by an extension measuring, 140 by 315 feet. The construction will be the same as in the original buildings, which were laid out and erected with particular attention to the probable needs of the future, and will meet the present necessity for additional storage space. The addition to the main warehouse will require the installation of a few heavy machines, as the cutting facilities will be increased.

SALE PROPOSITION REFUSED.

The stockholders of the Hamilton Iron & Steel Co., which owns the furnace at Hamilton, O., held a meeting in Cincinnati, Oct. 26. A proposition to lease the furnace property to a syndicate headed by M. L. Sternberger, Eugene Zimmerman and John Sargent, was voted down. After the meeting it was understood that arrangement will be made to secure the necessary capital to operate the plant and R. E. Field, secretary of the company, stated that the stack would be put in blast in the near future.

APPOINTED SELLING AGENTS.

Walter-Wallingford & Co. have been appointed selling agents for the pig iron of the Southern Iron & Steel Co., in Chicago, Detroit, Cleveland, Pittsburg, Cincinnati, Louisville and all intermediate territory. Arrangements are under way for the opening of a Chicago office of Walter-Wallingford & Co. The Southern Iron & Steel Co.'s stacks are, Chattanooga, Trussville, Rising Fawn and Gadsden. The two former furnaces are running on foundry iron.

SCRAP DECISION

Will Change Tariff Rate on British Importations.

Washington, Oct. 25.

The treasury department Saturday handed down a decision on iron and steel scrap that is important in view of large imports that are being made from Great Britain. The decision was brought about by a dispute between Philadelphia importers and the collector at the port of Philadelphia. The consignee of 3,000 tons of steel crop ends, brought from Middlesbrough, Eng., on the steamship Winnie, held that it should be classed as scrap, thus seeking to have various sections of the tariff law applied according to the grade of material. However, as the cargo was composed of mixed materials of various grades, the collector was undecided as to the rate to apply and referred the question to Washington.

The decision establishes that no scrap is entitled to classification under paragraph 118 of the new tariff law unless reduced by heat from a solid to a liquid state. The department holds that scrap iron and scrap steel which may be remanufactured by being subjected to intense heat and then rolled or hammered to the size or shape desired is not scrap iron, within the meaning of the law. This is because the term "melting" is used in the law in its ordinary acceptation, that is, to become liquid through heat.

PIPE FOUNDRY AT NORFOLK.

The Lynchburg Foundry Co. interests are preparing plans for a cast iron pipe foundry to be located on a large site acquired some time ago at Norfolk, Va., and construction work will be begun in the early future. At the outset, the foundry will have a capacity of 100 tons per day, but provision will be made for the necessary extensions to enlarge this output at any time. The location was chosen because of the opportunities afforded for shipment by water, particularly to New England and other large consuming districts up the coast, from which the Lynchburg company has been largely cut off because of the high rail rates. The Norfolk works will be operated as the McWane Tidewater Pipe Works Co., a corporation which will be controlled by the Lynchburg company.

The pig iron production in France for the first half of 1909 was 1,713,461 tons, a decrease of 33,173 tons as compared with the same period in 1908.

PERSONAL.

Gen. E. Burd Grubb, a well-known furnaceman of the eastern district, has been seriously ill of late, but his condition now shows some improvement.

H. L. Hanson, formerly in the sales department of the Columbia Steel Co., Elyria, Ohio, is now associated with David Evans & Co., The Rookery, Chicago.

O. G. Lewis, formerly chief engineer with the Dobbie Foundry & Machinery Co., Niagara Falls, N. Y., has accepted a position in a similar capacity with the Calumet Engineering Works, Harvey, Ill., succeeding John Morgan.

DEATH OF PRESIDENT BROWN OF COLONIAL STEEL CO.

Former Congressman Jas. W. Brown, president of the Colonial Steel Co., Pittsburg, and a prominent member of the iron and steel fraternity of the Pittsburg district, died Oct. 23 at the club-house of the Pont Mouille Shooting and Hunting Club on the St. Clair flats near Detroit. Apparently in good health, Mr. Brown had left Pittsburg a few days previous on a short shooting trip. He was suddenly stricken with an attack of acute indigestion superinducing heart failure Friday evening.

Mr. Brown had spent practically his entire life in the iron and steel business. He was born in Pittsburg 65 years ago and was the son of Wm. R. Brown, a pioneer iron and steel manufacturer of that city. After completing his education in Pittsburg he entered the iron business with his father. Four years later, in 1866, he became associated with the Wayne Iron Works of Pittsburg, and after a period of meritorious service he accepted in 1876 the position of assistant mill manager of Hussey-Wells & Co. He filled various responsible positions with that firm and was finally admitted to partnership, the firm becoming Hussey-Brown & Co. and later Howe-Brown & Co.

When the Crucible Steel Co. of America was formed, the interests of Howe-Brown & Co. were absorbed and Mr. Brown became one of the vice presidents and general sales agent of the corporation. He retired from the company eight years ago and formed the Colonial Steel Co., establishing a plant at the new town of Colona opposite Monaca on the Monongahela river. He continued as president of this company until his death.

In 1902, Mr. Brown was elected to congress on the Citizens-Democratic ticket and served one term. He became one of the leading representatives of the iron and steel industry in that body and lent invaluable aid to it during his legislative career. Mr. Brown was identified with Pittsburg banking interests and was prominent in Masonic and club life.

DEATH OF L. A. CRANDALL.

L. A. Crandall, manager of the western branch of the J. W. Paxson Co., Toledo, died at his home in that city, Sunday, Oct. 17, after a short illness. For nearly 25 years he was connected with the foundry supply and equipment trade in various capacities, and his acquaintance among foundrymen extended to every state in the Union. To his intimate knowledge of the foundry business and his ability to make and retain friends his unusual success as a salesman was attributed.

JAS. W. BROWN.

Mr. Crandall was born Jan. 21, 1850, and served an apprenticeship as a machinery molder. Before entering the foundry supply trade, he served as foreman and superintendent of a number of large foundries. For nine years he was in the employ of Byram & Co., Detroit, in the capacity of traveling salesman, and later he was similarly employed by two large foundry supply houses. About 11 years ago he designed the Crandall or bosh cupola, and many furnaces of this type have been installed throughout the country, while this bosh attachment has been placed on a number of other makes of cupolas. The Crandall cupola is now manufactured by the J. W. Paxson Co., Philadelphia, with which concern Mr. Crandall became associated less than one year ago. He was one of the organizers of the Detroit Foundry Supply Co., in which he was largely interested and served as vice president for several years.

H. W. Conger, vice president and general manager of the Milwaukee Harvester Co. until its absorption by the International Harvester Co., died in San Francisco last week, aged 60 years. Interment was made at Racine, Wis.

William H. Lutton, formerly superintendent of the Schoenberger mills at Pittsburg, and one of the first steel rollers in western Pennsylvania, died Oct. 24, at his home in Cleveland, aged 86. Retiring from the Schoenberger mills in 1870, he became superintendent of the Cleveland Rolling Mill Co.'s plant, serving until 1873, when he retired from active business.

Thomas J. Hayward, sole proprietor of Bartlett, Hayward & Co., iron and stove founders, whose plant is located in Baltimore, was found dead in bed Saturday, Oct. 23. Mr. Hayward, who was 63 years of age, had been a sufferer from heart trouble for some time. The Bartlett-Hayward firm is one of the best known in Baltimore. For a time it conducted the old Winans Locomotive Works as a branch. In recent years, under the direction of Mr. Hayward, it did more to develop heating and ventilating apparatus than any other concern of the kind in this part of the country.

Thomas A. Mack, for ten years a resident of New York City, died there Oct. 25. Mr. Mack was one of the foremost iron and steel commission brokers in the Ohio valley when he was a resident of Cincinnati. He was a Scotchman by birth, a graduate of the Royal Mining College at London, and when he came to America he was thoroughly equipped to deal with the rapidly expanding metal business of the United States. He started and developed numerous mining enterprises, among which were the Oxmoor iron mines of Alabama, which were later acquired by the Tennessee Coal, Iron & Railroad Co. As an iron and steel broker, he handled the output of many furnaces. At his removal to New York, his business was purchased by Walter-Wallingford & Co.

M. A. Love Mfg. Co., Rockport, Ill., has started construction work on a proposed new foundry which will double the capacity of the old foundry.

Stock Prices Decline During Week

The advance of the discount rate of the Bank of England was the one great feature of the world's markets last week.

Monday the market was active and irregular. Steel common constituted about one third of the market and advanced to 93, broke to 90⅞ and then reacted to 92⅜. On Tuesday, the market was less active and irregular, Steel Common, constituting about one fourth of the market, closed at the lowest price of the day. Wednesday, an advance in sterling exchange gave rise to talk of gold exports. The market was active and irregular, again closing lower. Thursday the Bank of England rate was advanced to 5 per cent. This action did not greatly affect the New York money market and, after a weak opening stocks advanced. Friday, sterling exchange advanced to the gold export basis, and one million in gold was engaged for shipment from New York. The stock market was weak and lower, the largest decline being in Steel common, Union Pacific and Reading. On Saturday, stocks were weak and closed lower.

Money on call for the week ranged from 3 to 4¾, averaging about 4½. Time loans were not in urgent demand on account of the steadiness of the call loan rate. Clearings in the United States were estimated at $3,607,769,120, which was only ½ per cent less than the highest figure ever attained, and 34 per cent higher than the corresponding week last year. The actual reports of clearing house banks shows surplus increased $1,068,957; loans increased $3,988,200; deposits increased $4,977,700, and the ratio of reserve 26.3, against 26.2 the week before. Trust companies and non-member banks showed loans decreased $10,810,000; deposits decreased $21,789,700, and the percentage of reserve 17.3, unchanged. Exports of gold were officially reported from New York at $220,000, while imports amounted to $114,676. Failures during the week numbered 238, against 242 the week before, and 250 the corresponding week of last year. Liabilities in failures reported during the month up to Oct. 23 were $7,301,962, against $8,589,954 for the corresponding period last year. The fortnightly report of the Car Association shows that there were 12,546 freight cars still idle throughout the country. This compares with 38,806 for the report next preceding, 68,502 for the report of four weeks ago, and 207,173 two months ago. The number of shares dealt in on the New York exchange was 4,938,000, against 4,084,900 the week before, and 3,292,886 the corresponding week last year. Bonds, exclusive of government bonds were dealt in to the value of $16,862,000, against $16,810,000 the preceding week, and $20,441,000 the corresponding week the year before.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Oct. 23	Changes in week	Date 1909 Ann. M't'g.	Stock Outstanding	Dividend Basis	Dividend Last Declared	Dividend Date Last Div. Pay.
Allis-Chalmers	14¼	— ¾	Sept. 2	$19,820,000		2½ Q.	
Allis-Chalmers, pr	50⅛	—2⅜		16,150,000	7 cum.		Feb., 1904
American Can	11⅝	— ⅝	Feb. 2	41,233,300		1¾ Q.	
American Can, pr	81¼	—1½		41,233,300	7 cum.		Oct., 1909
Am. Car & Fdy	68¼	—2⅝	June 24	30,000,000		1¾ Q.	Oct., 1909
Am. Car & Fdy., pr	117½	—1⅜		30,000,000	7 n. c.	½ Q.	Oct., 1909
American Loc	57	—3	Oct. 19	25,000,000	5	1¼ Q.	Aug., 1903
American Loc., pr	116	+1		25,000,000	7 cum.	1¾ Q.	Oct., 1909
American Ship	67⅜	— ⅛	Oct. 13	7,600,000	4	1¾ Q.	Oct., 1908
American Ship, pr	110¾	.....		7,900,000	7 cum.	1 Q.	Sept., 1909
Am. Steel Foundries(new)	60	—1½	Dec. 2	17,184,000		1¾ Q.	
Barney & Smith	40	.....	June 1	2,000,000	4	.....	Sept., 1907
Barney & Smith, pr	100	.....		2,500,000	8 cum.	1 Q.	June, 1908
Bethlehem Steel	32½	—1¾	April 6	14,862,000		2 Q.	
Bethlehem Steel, pr	65½	+ ½		14,908,000	7 n. c.	.....	Feb., 1907
Cambria Steel	44⅝	+2⅝	Mar. 16	45,000,000*	3	¾ Q.	Aug., 1909
Cambria Iron	46½	— ¼		8,468,000*	4	1½ S. A.	Sept., 1909
Chicago Pneumatic Tool	31	+ ¼	Feb. 15	6,145,000	4	2 S. A.	Oct., 1907
Colorado Fuel	43⅞	—1⅛	Oct. 18	34,235,500		1 Q.	April, 1902
Crucible Steel	13½	— ¾	Oct. 20	24,578,400		3½	
Crucible Steel, pr	82	—2⅛		24,436,000	7 cum.	1½ Q.	Sept., 1909
Empire Steel	10	.....	April 27	1,254,770		1 Q.	
Empire Steel, pr	70	.....		2,500,000	6 cum.	.....	July, 1909
Fay & Egan	90	.....	Feb. 18	1,000,000	7	3 S. A.	Nov., 1908
Fay & Egan, pr	110	.....		1,000,000	7 cum.	1¾ Q.	Aug., 1909
General Electric	160	—4¼	May 11	65,179,600	8	2 Q.	Oct., 1909
Harbison-Walker	32	+1	Jan. 18	18,000,000		2 Q.	Oct., 1907
Harbison-Walker, pr	95	.....		9,600,000	6 cum.	1½	Oct., 1909
International Pump	47	—2	June 8	17,762,500		1½ Q.	April, 1905
International Pump, pr	88	—1¾		11,350,000	6 cum.	1½	Nov., 1909
Lackawanna Steel	61	+3¼	Mar. 10	34,971,400		1½ Q.	
Lake Sup. Corp	27	—2	Oct. 6	40,000,000		.....	
New York Air Brake	87	— ⅞	June 17	10,000,000	8	.....	Oct., 1907
Niles-Bement-Pond	104	+4	Feb. 3	8,500,000	3	2 Q.	Sept., 1909
Niles-Bement-Pond, pr	104	+4		2,000,000	6 cum.	1½ Q.	Aug., 1909
Otis Elevator Co	55	—1	Mar. 15	6,375,300		1½ Q.	Oct., 1909
Otis Elevator Co., pr	96	—1		6,295,000	3 n. c.	1½ S. A.	Oct., 1909
Pa. Steel	70	+4	May 10	10,750,000		1½ Q.	
Pa. Steel, pr	116	—1		16,500,000	7 r. c.	3½ S. A.	Nov., 1909
Pittsburg Coal Co	20½	— ⅛	Mar. 9	32,000,000		3½ S. A.	
Pittsburg Coal Co., pr	61⅛	+1⅛		32,000,000	7 n. c.	.....	April, 1905
Pressed Steel Car	46½	—1¼	Feb. 17	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	106	+ ¾		12,500,000	7 n. c.	1¾ Q.	Aug., 1909
Pullman	191	+1	Nov. 10	100,000,000	8	2 Q.	Aug., 1909
Railway Stl. Spring	45⅛	+1⅞	Mar. 4	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	108	—1		13,500,000	7 cum.	1¾ Q.	July, 1909
Rep. Iron & Steel	44½	—2	Oct. 20	27,191,000		.....	
Rep. Iron & Steel, pr	104	—2½		20,416,900	7 cum.	2½ Q. †	Oct., 1909
Sloss-Sheffield	89	—4¼	Mar. 10	10,000,000	5	1¼ Q.	Sept., 1909
Sloss-Sheffield, pr	120	.....		6,700,000	7 n. c.	1¾ Q.	Oct., 1909
U. S. Pipe & Fdy. Co	32	+ ¼	June 23	12,106,300	2	1 Q.	Dec., 1907
U. S. Pipe & Fdy., pr	85⅛	— ¾		12,106,300	7 n. c.	1¾ Q.	Sept., 1909
U. S. Steel	86⅝	—5¼	April 19	508,302,500	3 n. c.	¾ Q.	Sept., 1909
U. S. Steel, pr	125⅞	—2¾		360,781,100	7 cum.	1¾ Q.	Aug., 1909
U. S. Steel, 5s	114¾	.....		463,798,000	5	1¾ Q.	
Va. Iron, Coal & Coke	70	.....	Sept. 21	9,073,680		5 A.	
Westinghouse Elec	84½	—1½	June 16	27,173,200	10	2½ Q.	Oct., 1907
Westinghouse Air Brake	139⅝	—3⅛	Oct. 5	14,000,000		2½ Q.	Oct., 1909

Par value of shares, $100, except those starred (*), $50.
†Includes deferred dividend of ¾ of 1 per cent.

Copper Stocks.

New York.—Amalgamated Copper closed 79½, a decrease of 3⅞.

Boston. — Butte Coalition closed 26⅞, an advance of 1⅞; Calumet & Arizona closed 98, decrease 2; Calumet & Hecla closed 640, decrease 20; North Butte closed 56½, a decrease of 2½; Quincy Mining closed 86, a decrease of 1.

Financial Notes.

The Amalgamated Copper Co. has declared its regular quarterly dividend of 50 cents a share, payable Nov. 29 to stock of record Oct. 28.

The Pullman Co. has declared a quarterly dividend of $2 a share, which will be paid Nov. 15 to stock of record Oct. 30.

The Warwick Iron & Steel Co., Philadelphia, has declared its semi-annual dividend of 3 per cent, payable Nov. 15 to stock of record Oct. 30.

The J. G. Brill Co. has declared a quarterly dividend of 1¾ per cent on preferred, payable Nov. 1 to stock of record Oct. 26.

The American Brass Co. has declared the regular quarterly dividend of $1.25 a share and an extra dividend of $1 a share, payable Nov. 1.

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THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January	5,506
February	5,346
March	5,396
April	5,508
May	5,533
June	5,551
July	5,572
August	5,597
September	5,609

October 28, 1909.

THE RECENT RAPID INCREASE OF STEEL BAR CONSUMPTION.

The large tonnage now on makers' books awaiting delivery which on some sizes cannot be made in less than from five to six months, directs attention to the remarkable increase of merchant steel bar consumption in recent years. The spread of the consumptive movement in steel bars and products of the steel bar mill appears to have eclipsed, proportionately, that of any other form of iron and steel material in the recent history of the industry. The present volume of tonnage moving from the mills into general lines of use is at the high record rate for the steel business.

Steel makers estimate that at the present time fully 20 per cent of the total steel converted into finished lines goes to the bar mills to be rolled into various sizes and forms to supply the current demand. A few years ago, the steel bar end of the general total of finished material of the country was not more than from 10 to 15 per cent, or at the highest, approximately 2,500,000 tons. Conservative estimates by prominent makers today place the present rate of steel bar production in the United States at about 4,000,000 tons, a heavy gain over the mark set only a few years ago.

In times of general business activity in the industry, steel bars by reason of their greatly diversified use, have usually been the first to register heavy consumptive needs by the buying public and bar mill capacities have quickly filled up with the consequent falling behind in deliveries. In 1906 and during the greater part of 1907, the buying movement in bars reached a height hitherto unknown in the industry and mill outputs in some cases were inadequate to meet the demands upon them. The consumptive movement now under way is running at a rate considerably ahead of any other year of the past.

Various explanations are offered for the greatly increased absorption of this material by the country at large. Steel bars by their nature may be termed a strictly intermediate product, since their main source of use is in manufacturing plants where steel enters into the production of the finished article. The wonderful growth of the automobile industry in recent years has provided a great field for bar consumption and is now one of the most conspicuous of the greater avenues of outlet for mill tonnage. The farming communities, by their increased buying of machinery, and other products of the manufacturer designed for agricultural pursuits, have been a factor of much importance in the greater market. Another source of heavy consumptive increase to which steel makers are attaching much consideration, is the development of the manufacture of metal specialties. The growth of this industry stands out prominently in a retrospect of the changes in commercial activity that have been undergone within a comparatively few years.

The increasing adoption of concrete construction of buildings is also giving rise to an important new form of use of steel bars for reinforcement purposes. This class of consumptive demand is a distinct addition to the general absorption of steel products since its development has apparently not curtailed the call for structural plates and shapes in building operations.

How rapid or long-continued will be the increased demand for steel bars from the various supporting industries, are problems to which the steel maker is now giving attentive consideration. As related to the current volume of business, present mill capacities in many cases are wholly insufficient and plans are already being formulated and advanced for the broadening of rated outputs.

IRON AND COMMODITY PRICES.

The course of prices in the iron and steel industry in the past 20 years has shown a remarkably close conformity with the general movement of commodity prices, and where there has been a divergence it has generally been observable that the iron and steel prices were at fault. The sudden rise in iron and steel prices in 1895, for instance, was entirely out of line with the general price movement, and the disastrous ending of that short-lived boom is well recalled.

There are a number of compilations of index prices of commodities, and the one undertaken a few years ago by the department of commerce and labor has much to commend it. In particular, the grouping is on the most modern basis of any of the well-known compilations. As times change, the relative importance of different commodities changes, and doubtless, if some of the older systems were to be formulated afresh, the grouping selected would be different. Important modifications, however, are impossible without impairing the value, for comparative purposes, of the older averages reached.

The department of commerce and labor system was formulated in 1901, prices being gathered from the years 1890 to 1901 inclusive, and the fresh

statistics have been added year by year, the 1908 compilation having lately appeared. Some slight additions to the list have been made, the total list now including 258 commodities, each of which obtains equal weight in striking the average. The rating for a given class of commodities is done by using a larger or smaller number of descriptions of material in the class. Thus four grades of pig iron are taken, but only one grade of steel sheets. Of course the relative importance of different commodities cannot be precisely represented by such a system, but the general results are no doubt quite representative. The different groups of commodities, farm products, food, clothing, fuel, etc., are represented by a larger or smaller number of items, according to the assumed importance of the group.

For the purpose of showing roughly the difference between price movements in crude and finished materials, a group of 54 articles is selected as representing raw commodities, the remaining 204 articles being classed as manufactured commodities.

With each commodity, the average price in the 10 years, 1890 to 1899, inclusive, was taken as standard, or 100 per cent, and the average price in each year is compared with this 10-year average to obtain the percentage price for the year, the index percentage for the year being the average of the 258 percentages.

The index prices for the past 19 years are shown in the table below, the basis (100) being the average of the 10 years, 1890 to 1899, inclusive:

AVERAGE COMMODITY PRICES.

	Raw.	Manufactured.	All.
1890	115.0	112.3	112.9
1891	116.3	110.6	111.7
1892	107.9	105.6	106.1
1893	104.4	105.9	105.6
1894	93 2	96.8	96.1
1895	91.7	94.0	93.6
1896	84.0	91.9	90.4
1897	87.6	90.1	89.7
1898	94 0	93.3	93.4
1899	105.9	100.7	101.7
1900	111.9	110 2	110.5
1901	111.4	107.8	108.5
1902	122.4	110.6	112.9
1903	122.7	111.5	113.6
1904	119.7	111.3	113.0
1905	121.2	114.6	115.9
1906	126.5	121.6	122.5
1907	133.4	128.6	129.5
1908	125.5	122.2	122.8

The interest of the iron and steel trade, of course, is in observing how the movement in iron and steel prices compares with the general movement in commodity prices. There is a closer correspondence than would probably be assumed without investigation. For instance, a disposition is sometimes shown to attribute the prices obtained for steel products in recent years to the creation of a single large producing interest, whereby prices either are higher than before the 1893-8 depression, or do not show a decline in keeping with economies and improved methods which have been introduced. We see, however, by the above table that in not one of the past seven years has the average of commodity prices been lower than the 1890 average, while each year shows a much higher average than the average of the three years, 1890-1-2. Similar comparisons of iron and steel prices alone would show that iron and steel prices have been much lower in the past seven years, compared with the general level, than in the years prior to 1893.

The general movement of iron and steel prices has been in close keeping with the movement in the average of commodity prices. Thus, the lowest prices of iron and steel in all history were made in 1897, and that year is the lowest of the 19 in the general average. In commodities as a whole, and in iron and steel in particular, the general trend was downward from 1890 to 1897, and upward thereafter until 1907, while in 1908 there was again a decline.

The rise in iron and steel prices which began in May, 1895, was very seriously taken by the trade at the time, it being promptly assumed that the depression was over. Prices advanced by leaps and bounds until late in the year, when the whole movement collapsed, and 1895 saw a greater depression than ever in the iron and steel trade. The irrationality of that boom is shown by the average of commodity prices, the year 1895 being merely one of a series in which the general price level declined. The ephemeral boom of 1895 did not rest on the proper foundation.

There are later instances of the iron and steel industry attempting a swing of its own and failing in the attempt because general conditions did not support the movement. There have been such attempts in either direction. In 1899 the iron and steel trade underwent a boom, prices soaring to almost unprecedented levels, but the boom collapsed. The general price level in 1899 was only 1.7 per cent above the general average for the 10-year period ending 1899. In 1900, the iron and steel trade undertook a depression, prices of some commodities falling almost to the 1897 minimum, but that undertaking likewise collapsed, because the general trend was upward. In 1902, the iron and steel trade got ahead of the procession again, with large advances when the general level advanced only moderately. Trouble again ensued, and the trade started in for another depression, but was pulled out perforce. Iron and steel prices underwent heavy reductions when the general average of commodity prices, in 1904, declined but a fraction of 1 per cent, and there was a correspondingly quick recovery.

Throughout the 19-year period covered by the above table, iron and steel prices, with the exception of the ephemeral boom in 1895, have moved contemporaneously with the movement in commodities as a whole, but the fluctuations have been wider. The iron trade may well be considered the barometer of general trade, for it has not only shown the general movement, but has magnified the appearance.

The fact has been much commented upon that the rise in iron and steel products since 1897 has been much greater in the cruder materials than in the more finished product. The passing of the raw materials of the industry into strong hands has furnished the ready and conclusive explanation of the phenomenon, but it is far from uninteresting to observe that in commodities at large, according to the grouping adopted by the department of commerce and labor, the advance in raw materials has been greater than the advance in finished products. This is shown clearly in the table given. From 1890 to 1892, inclusive, raw commodities were dearer, year by year, than manufactured commodities; from 1893 to 1897, inclusive, they were cheaper, and since then they have been dearer again. That is substantially the showing the iron and steel industry has itself made, and apparently there is nothing in it which is remarkable or which calls very loudly for special explanation.

AMONG MACHINERY MAKERS.

NEW YORK.

Prices Advance With Increased Costs of Production.

Office of THE IRON TRADE REVIEW,
Room 1005, No. 90 West St., Oct. 26.

Machine tool interests generally report the current month so far as considerably more active than September. The business now developing is coming from various fields and is made up of numerous small and moderate orders, the ideal situation so long as the aggregate bookings are sufficiently large. The demand is well distributed among both light and heavy tools, although railroad inquiries of size are still conspicuously absent. There are those who believe the buying by automobile interests is pretty well over, citing a lull during the past fortnight as evidence of the beginning of the end, but it is surprising to note the part which this industry has played and is still playing in the machine tool trade. The lines on which recent price advances have been made are those which have been in chief demand by automobile makers, scattered advances of 10 per cent having been announced on lathes, millers, drill presses and in some instances on gear cutters. Except for a few carried in stock by the larger dealers, gear cutters of certain makes cannot be secured short of 10 months and milling machines before April or May. Planers are in good demand and a strong call is noted for automatic screw machines, while hand screw machines are also more active. Crane orders are still rather few and brisk competition for the inquiries developing is keeping prices down.

In connection with scattered price advances on various lines of machine tools it is interesting to note that the automobile industry has been responsible for an actual increase in labor costs. During the depression the manufacturers of motor cars were able to operate practically full and availed themselves of the quantity of skilled labor without employment to fill their shops with skilled machinists, in many cases being able to draw away many of the best workmen whom the machine tool makers were endeavoring to hold through the idle period because of the higher wages they could offer. Now that activities with the machine tool makers have reached such a stage that the labor consideration has become important, it is found that the better class of machinists available is extremely small and that the labor which can be had, because of its relatively lower efficiency, is causing a perceptible increase in this item of production costs. Material costs are also higher, but not to such an extent as to make any important difference in the finished machine.

A heavy inquiry for industrial cars, particularly for export, is noted. The Youngstown Car Mfg. Co. has made a sale of 28 large flats for fruit service in Guatemala.

The plans of the Pratt & Whitney Co., Hartford, Conn., which as yet are rather indefinite, call for the construction of a large storage building and an addition to the small tool shops. The total expenditure for this purpose will probably be about $150,000.

The list of machine tools for which the Norfolk & Western recently inquired for its Norfolk shops will run close to $50,000. It is not anticipated, however, that awards will be made for several weeks.

The Carteret, N. J., district is being watched with considerable interest by the steel and machinery trade, as it is the scene of important development work. The United States Metals Refining Co., offices of which are at 42 Broadway, has purchased 12 acres adjacent to its copper refining works at that place and, it is understood, will erect a plant for the treatment of lead. This district can accommodate ocean-going vessels and has unusually good railway facilities.

Plans are being prepared for a large cast iron pipe plant to be located at Norfolk, Va., by the McWane Tidewater Pipe Works Co., which will be controlled by the interests owning the Lynchburg Foundry Co., Lynchburg, Va. The new foundry will occupy a site secured for this purpose some months ago, and at the outset will have a daily capacity of 100 tons, though provision will be made for doubling this output at any time. Eventually it is anticipated that the McWane interests will enter the blast furnace field, as the melting capacity of their various plants is already large.

The Reeves Foundry Co., Corning, N. Y., is about ready to begin operations.

The Industrial Securities Co., 25 Broad street, is in the market for a concentrate dryer and other equipment for the plant of the St. Lawrence Pyrites Co.

PITTSBURG.

Railroads Buying More Freely—Forging Machinery in Demand.

Office of THE IRON TRADE REVIEW,
510 Park Building, Oct. 26.

The current run of machinery business continues excellent and the market has all the appearance of sustained vigor. There is a good demand for equipment intended for the enlargement of present capacities, in fact this is one of the main features in the heavy machinery situation. The small forge shops and the locomotive builders are providing makers with many orders for forging machinery and some notable contracts have been placed for large forging presses where blooming mill capacities have not been required. The railroad shops are buying small tools more freely and the condition of the machine tool market in general is one of greater promise.

The Union-Connellsville Coke Co. is erecting a new modern coke plant in Redstone and Luzerne townships, Fayette county, near the Royal and Mitchell plant of the W. J. Rainey interests. At the present time 75 ovens of the rectangular type have been completed and are being slowly fired, while 65 additional ovens are under course of construction. It is planned that the plant eventually will have about 250 rectangular ovens. Jas. R. Cray, of Uniontown, Pa., is president of the company.

The Republic Iron & Steel Co. has awarded contracts to the United Engineering & Foundry Co., for furnishing the tube mills and other rolling machinery for the new tube works to be erected by the company near Youngstown, O. The equipment will have a capacity of producing tubular goods from three to 12 inches in diameter.

Prospects for considerable buying of steel ore cars within the next several months are promising. The principal roads in the Superior regions have tentative requisitions for equipment now under consideration and are expected to arrange the obtaining of the appropriations presently. Some of the steel companies are buying ore cars, a recent contract of this class being that for 20 cars awarded the Summers Steel Car Co., Pittsburg, by the Pennsylvania Steel Co. for use on the Cornwall & Lebanon railroad. In connection with the increased interest in the steel car market by the railroads,

the Pressed Steel Car Co. is conducting experiments with an all-steel street car, which, if successful, will probably result in some improvements to the New Castle plant for the manufacture of this class of rolling stock.

The Banning Connellsville Coke Co., capitalized at $200,000, has been incorporated by Enoch H. Abraham, Uniontown, Pa., Robt. W. Gilmore, Dunbar, Pa., Elias Wineland, Bernard A. Illoway, and Abraham Strouse, all of Philadelphia. Robt. W. Gilmore, Dunbar, Pa., is treasurer. The company has awarded the contract for 75 coke ovens at their works at Banning, Pa., in the Connellsville regions, 60 of which will be completed by Jan. 1, 1910.

The United Engineering & Foundry Co., Pittsburg, manufacturer of rolling mill machinery, rolls, gears and other mill equipment, has added a new line to its operations in the building of forging machinery. A number of orders have already been taken and the volume of business of the department is expanding very favorably. The company's extensive plant equipment enables it to furnish forging machinery of practically all capacities, and it is in a position to build hammers up to 5,000 pounds and presses up to 8,000 tons. The company is a maker of its own steel and controls all operations from pig iron to the finished product. Jas. A. Eden Jr. is manager of the new department.

CINCINNATI.

While Light Machinery Has Call, Yet Demand Broadens for Heavier Lines.

Office of THE IRON TRADE REVIEW,
First National Bank Bldg., Oct. 26.

The demand for machine tools appears to show but little change as to volume or in general character. The lighter lines which are useful to the automobile industry continue to have the call, while the heavier lines are responding more slowly to the increase in activities, but business in heavy radial drills, planers and large lathes is gradually broadening with manufacturers in this center continuing to hold the view that the improvement in the machine tool trade is permanent. There is continued talk in the trade of the necessity for advancing prices, due to steadily increasing cost of manufacture. The shops are adding to working forces as rapidly as desirable men can be secured. Accumulated stocks are disappearing and most of the shops have only a few odd sizes on hand, while a number of the manufacturers are entirely out of stock with orders ahead on which deliveries cannot be made for five or six months. Some improvement is noted in the call for wood-working machinery, which has been rather slow.

The Willard Machine Tool Co. is making preparations to move into its new building in Covington about the first of November. The company will manufacture a line of lathes especially designed for automobile shops.

The Triumph Electric & Ice Machine Co. has issued invitations to a reception at the opening of its new plant at Oakley, Saturday afternoon, Oct. 23.

The John B. Morris Foundry Co. has booked some nice lathe orders during the week and reports the foundry busy.

The R. K. LeBlond Machine Tool Co. advises that business is good and that enough orders are in hand to keep the shop busy for five or six months.

Greaves, Klusman & Co. report business good with the orders received so far this month exceeding the orders received in September. The firm also notes a better inquiry for wood-working machines.

The Cincinnati Bickford Co. notes a continued steady call for light and medium size drills and says that demand is of a character indicating that continued good business is expected.

The Bradford Machine Tool Co. reports business holding up to its recent good level and the outlook entirely satisfactory.

CLEVELAND.

Some Concerns Running Night Shifts —Plant at Willoughby to be Closed.

Office of THE IRON TRADE REVIEW,
Browning Building, Oct. 26.

The Bowler Foundry Co. advises that its orders for October are keeping up with those received during the summer months. All indications point to a good business during the winter for this concern.

The W. W. Sly Mfg. Co. has been rushed with orders during the past six months, and at the present time, its plant is four months behind on orders. This concern is now in line with sand blast equipment. It recently received a large order from an eastern sewing machine manufacturer, and has also installed this equipment with other large firms, with the prospect of duplicating the orders for branch plants.

The Cleveland office of the Ransome Concrete Machinery Co. has been given up, and hereafter, A. L. Giles, the Ohio representative of this concern, will be located at 1299 Fair avenue, Columbus, O. This company has been running its plant day and night, seven days a week, to be able to turn out orders on hand, both for concrete machinery and the Ransome patent telescopic steel sewer and tunnel mold.

The Canton Foundry & Machine Co., Canton, O., advises that it has been obliged to put on a night shift to take care of the demand for its metal ceiling drop hammer. A metal ceiling plant, including hammers and dies, was recently shipped by this concern to a company in Sydney, Australia.

The Cleveland Belting & Machinery Co. states that it is receiving double the inquiries of several months ago, and that its business in all lines is looking up.

The Chisholm & Moore Co., manufacturer of malleable iron castings, chain hoists, etc., is running full in every department of its business, and falling behind on orders in the malleable department.

The Dayton Computing Scale Co., the Graves & Marshall Foundry Co. and several other Dayton, O., firms suffered heavy losses by fire Oct. 21. The blaze was first discovered in the Scale company's plant, from which it spread rapidly to neighboring buildings. The total loss, about $400,000, is covered by insurance. About 1,000 men were forced out of employment as a result of the fire.

The Youngstown Foundry & Machine Co., Youngstown, O., is removing its East Boardman street plant, all the equipment that it used for the manufacture of steel castings, and is equipping this plant for the manufacture of sand chilled and semi-steel rolls exclusively. The concern is installing a 25-ton air furnace and a cupola, together with six roll lathes of its own manufacture. All machinery will be electrically driven. All material has been purchased for these improvements, and the plant is expected to be in full operation about the middle of December.

The American Fork & Hoe Co., Willoughby, O., has announced that it will close its plant there permanently about Dec. 1. Its equipment will be moved to Jackson, Mich., where it claims it can operate at less expense. Employes have all been offered positions at the Ashtabula, O., plant or at Jackson.

The Warwick Iron & Steel Co. will erect a number of houses for its employes on the Chester County side of the Schuylkill River opposite Pottstown. This district is enjoying an unusually busy Fall.

CHICAGO.

Pressing Demand for Machine Tools Causes Slow Delivery.

Office of THE IRON TRADE REVIEW, 1328 Monadnock Block, Oct. 25.

The machinery trade in Chicago continues to enjoy a very satisfactory business, and in the case of some houses, the volume of business coming in at present, and also that which has been handled in the immediate past, is the heaviest in their history. It is difficult, or rather impossible, to carry full stocks of high grade machinery, so pressing has been the demand and so slow the filling of orders by manufacturers. On gear-cutting machines, and milling machines and grinders, delivery is not expected until next year, in some cases as late as March. On the better class of lathes, and tools of that character, the congestion is almost as bad. Much difficulty has been experienced by machine tool makers, and by machine shops generally, in securing enough skilled labor to man their shops properly. The automobile manufacturers have been so swamped with orders, that they have offered to pay wages which are much more than the ordinary commercial machine shops can pay and the latter have lost many of their men. It is also true that there are not so many journeymen machinists being graduated as formerly, one very cogent reason for this being that skilled labor in other lines is being paid very much higher wages than are the machinists, and such lines, as a matter of course, are enrolling the young men who are anxious to learn a trade, and the machinist's trade is losing many recruits who otherwise might be attracted to it.

The movement looking to the electrification of the steam roads entering Chicago, is attracting much attention on the part of the public. The Northwestern road, it is announced, will change suburban and freight-switching locomotives within the city limits to coke-burning engines, which is looked upon as a concession to those seeking an abatement of the smoke nuisance in Chicago, and a first step toward ultimate electrification. The Illinois Central officers and directors are on record as opposed to electrifying their Chicago terminals, and the city administration threatens to enforce the anti-smoke ordinance more rigidly than ever.

The Western Iron Stores Co., Milwaukee, Wis., has been incorporated with a capital stock of $100,000 to transact a general jobbing business in iron and steel machinists' supplies. The company is occupying the entire three-story building in Milwaukee, at 159 West Water street. The officers are as follows. O. L. Prime, president; C. F. Zimmerman, vice president; and J. R. Petley, secretary and treasurer. Mr. Prime is also president of the Prime Steel Co.; Mr. Zimmerman was formerly connected with the Philip Gross Hardware Co., and Mr. Petley was formerly purchasing agent of the National Brake & Electric Co., all of Milwaukee.

MILWAUKEE.

Nice Orders Received and Improvements Made.

Milwaukee, Oct. 25.

The Northwestern Steel & Iron Co., of Eau Claire, Wis., has purchased the entire factory equipment of the Miracle Pressed Stone Co., of Minneapolis, Minn., and will henceforth manufacture the Miracle concrete machinery for the Minneapolis concern. The Northwestern company has started on a second story on the machine shop, 50 x 150 feet in dimensions. A large warehouse will be erected also. The main offices of the Miracle company will be retained at Minneapolis.

The Bucyrus Co., of South Milwaukee, Wis., is working on orders for locomotive pile drivers from the Chicago Great Western and the Rock Island railways.

The Central Iron Works, of Marshfield, Wis., Weiland & Son, proprietors, have been awarded a big heating contract by Philip Adler, including more than 3,500 feet of radiation.

The Harvey Spring Co., of Racine, Wis., is making a number of improvements to gain more space, and contemplates the erection of a large addition, probably next spring.

The Manitowoc Iron & Metal Co. has awarded contracts for a two-story brick office and warehouse building 50 x 100 feet on property leased from the "Soo" line.

The Wisconsin Incubator Co., of Racine, Wis., is building an addition, which will give it room to manufacture all of its metal parts, heretofore purchased from outside concerns.

The Wisconsin Novelty Co., of Stevens Point, Wis., recently incorporated to manufacture an attachment for sewing machines for sharpening knives, polishing jewelry, etc., has elected these officers: President, W. E. Kingsbury; vice president, Bernard Kane; secretary, C. E. Emmons; treasurer, H. H. Pagel. Mr. Kane has been appointed state agent.

Lock & Goodstein, dealers in old metal, second hand machinery, etc., Sheboygan, Wis., are contemplating the erection of a smelter in their yards, and will handle all metal there instead of shipping it away to be smelted.

BUFFALO.

Machinery in Good Demand—Railroads Are Still Holding Back Orders.

Office of THE IRON TRADE REVIEW, 932 Ellicott Square, Oct. 26.

Machinery is in good demand with more numerous inquiries for heavier units and in most cases early deliveries are asked. The tone of the market holds up well and generally is regarded as increasing in strength in all the leading lines. The railroad interests have caused some disappointment. They are not strong buyers at this point now or throughout the state. It had been expected that much material would be purchased for the shops, but railroad purchasing agents are holding back. Some explain that a little activity may be expected from this source prior to Jan. 1. At various points in western New York there will be several very large orders placed within the next few months.

The Westinghouse Electric & Mfg. Co. will install early in 1910 an additional unit of 10,000 horsepower at the Canadian plant of Niagara Falls Power Co. The Development & Funding Co., of Niagara Falls, N. Y., which is completing an addition to its plant, is installing electrical power equipment including four Westinghouse rotary converters of 1,000 horsepower each and 15 transformers with switching devices. The Buffalo & Lake Erie Traction Co. has ordered equipment for a subpower house to supply power at Buffalo for operating cars on a branch line between Buffalo and the works at West Seneca of the Lackawanna Steel Co. The Niagara Falls Power Co. has placed an order through J. L. Osgood for considerable machine shop equipment, including engine lathes, planers and boring machinery. As far as possible it is understood that the Niagara Falls Power Co. will hereafter do most of its machine work at its Niagara Falls plant. The Corrugated Bar Co., St. Louis, Mo., which started an experimental station at Buffalo, has made notable progress and now has a well equipped branch factory turning out corrugated bars.

A NEW ENGINE FOR PRODUCER GAS

A producer gas engine, the design of which has been a matter of exhaustive experimental work covering a considerable period, has just been placed on the market by the New York Engine Co., the offices of which are at 165 Broadway, New York, and the works at Watertown. The accompanying illustration gives a left hand, rear view of the engine and shows clearly the arrangement of the main driving pulley, outward crankshaft bearing and fly wheel, the water circulating system, compressed air starting pipes, air inlet pipe and separator, exhaust pipe and other details. The engine is intended for use principally where the brake horsepower required does not exceed 150, a single cylinder being employed; but engines up to 1,000 brake horsepower are built with multiple and double-acting cylinders.

Near the right of the illustration is shown the gas-throttle-valve and valve actuating mechanism, the mixing or inlet valve housing being bolted to the top of the explosion chamber and carrying a bracket to accommodate its rocking lever and a guide for its valve stem. The latter supports a yoke carrying two helical springs to insure the rapid seating of the valve. The outer end of this rocking lever engages with the upper end of a push rod, which reciprocates vertically through a long guide, actuating not only the inlet valve but also the gas valve as well, when the governor permits. The stem of the gas valve is placed horizontally and a single helical spring reseats it as soon as the pressure of the push rod is withdrawn.

Going on the principle that the best power impulse is to be secured from a cylinder nearly full of the best proportion of gas and air, the system of governing employed is that of cutting out explosions whenever the speed exceeds its predetermined limit, thereby reducing the quantity of the charge instead of its richness. The governor spindle is spur-gear driven from the end of the camshaft and rotates in a horizontal position. This arrangement is indicated in Fig. 1. The speed of the governor is secured by the ratio of this gearing, the result being an extremely sensitive control, automatic, through the introduction or removal of a latch enabling the inlet valve push-rod to actuate the gas valve push rod or leave it undisturbed. In practice, as soon as the engine speeds up to a point beyond the predetermined number of revolutions per minute, the rapidly-rotating governor balls move outward and withdraw the latch, with the result that during that particular suction stroke of the engine the gas valve does not operate, but remains closed while the engine sucks in air alone and not a mixture of air and gas. On its return stroke the piston compresses air alone; this expands on the next stroke and is then pushed out through the exhaust valve, incidentally clearing the combustion space of burnt gases and cooling the cylinder walls and valve heads. The speed of the engine decreases with the absence of a power impulse once in four strokes, and with that the governor balls move inward, thereby reintroducing the latch which permits the next suction stroke to aspirate a perfect explosive mixture.

Just behind the governor gearing case is the roller of the main admission rocking lever, which is engaged by a cam on the cam-shaft, operating the entire admission-valve mechanism once in every four strokes. Near the camshaft bearing, but not showing in the illustration, is the exhaust valve rocking lever roller with a pin projecting from the stud in the lever boss. In starting the engine,—as it is desirable to employ a compression considerably less than that used in normal operation, 200 pounds per square inch,—this roller is shifted along its stud until it engages with a double cam, which insures opening the exhaust valve slightly during the compression stroke. As soon as the engine has speeded up sufficiently, this roller is shifted back to its normal position and there secured by the pin.

Ignition arrangements include a magneto of permanent horsepower type, operated by an eccentric adjacent to the exhaust cam, which also, through its rocking armature connections, operates a make-and-break spark plug. The piston lubrication is from a feed-force oil pump, taking oil from a sight feed cup and delivering a constant quantity to the top every other revolution of the piston.

An ingenious indicator arrangement is provided. A stud projecting from the end of the crank shaft connects with a horizontally swinging lever, carrying a small bent rod whose upper end is forked to receive the knotted end of the indicator cord, the swing motion secured being coincident with and similar to the reciprocating motion of the piston.

Sheet metal oil guards are provided wherever needed. Another feature, apparent from the illustration is that the outward flow of the cooling water is through a curved vertical pipe at the front end of the cylinder. The inflowing water pipe passes in under the air admission pipe, being connected with a large elbow casting bolted to the side of the explosion chamber. The internal notches cut in the rim of the fly wheel are for facility in turning the engine over by hand.

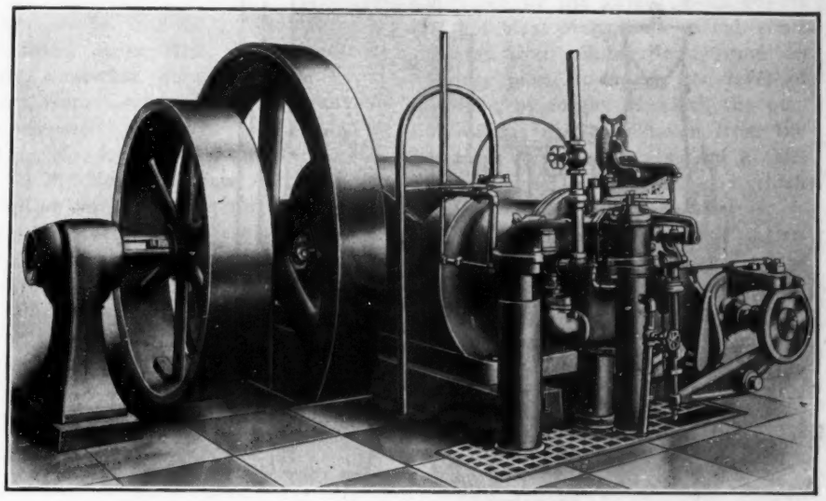


FIG. 1—ENGINE FOR PRODUCER GAS: NEW YORK ENGINE CO.

Because of the practice followed by the makers of these engines of rating them according to the brake horsepower developed at the rim of the band wheel, the governor cutting out 15 per cent of the total number of possible explosions, the user is assured of an overload capacity of 17 per cent, and the average indicated horsepower, as calculated from a large number of indicator diagrams, runs about this much in excess

of the brake horsepower shown by a friction brake.

The gas producer built by this company, illustrated in Fig. 2, is designed to meet the rigid requirements of pumping, electric lighting and similar service, where continuous operation 24 hours per day can be depended upon, and where at the same time there shall be a freedom from complicated methods requiring a skilled attendant. In the illustration, the generator is shown at the left, and is equipped with a ladder reaching the charging hopper and a hand blower for use in starting. From the generator the hot gases distilled from the coal pass up through the center of the vaporizer, a hollow annular casting bolted by its flange to the generator shell, and from the interior is supplied the water saturated air

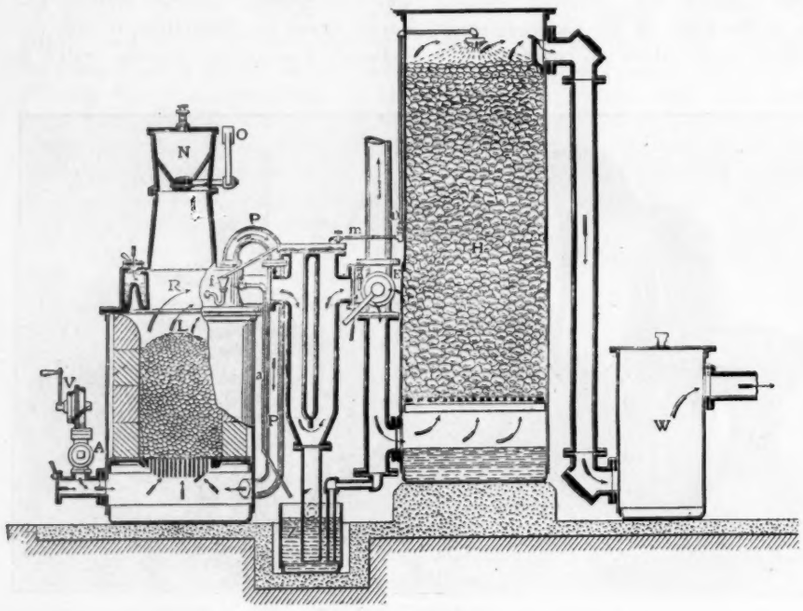


FIG. 2—GAS PRODUCER: NEW YORK ENGINE CO.

necessary for the production of gas. This mixture of steam and air is then carried by the downcomer pipe to the under side of the fire grate in the generator, connected with the upper part of which through the vaporizer is the separator, which also connects through a down-comer pipe, with the scrubber on the other side, a three-way valve permitting the passage of the hot gases either to the scrubber by way of the down-comer pipe or to the outer air by way of the purge pipe. The latter extends up about 30 feet, thereby insuring proper draft when the engine is idle. In the drain tank, located at the lower end of the separator, are deposited many of the small particles carried over from the generator.

An important feature of the scrubber is that, while the course of the gas is from below upward, the course of the cooling water is from the top downward, and the scrubber's height is such that by the time the gas reaches the top it is cooled practically to the temperature of the scrubber water as it leaves the sprinkler. In filling the scrubber, the smallest pieces of coke are at the top, and a steady stream of cooling water washes the dirt deposited in the upper layers down through the coarser coke layers until it accumulates in the bottom at a convenient place for drawing it off.

Leading from the upper part of the scrubber, the final down-comer pipe carries the gas, now cleaned and cooled, into the tank, from which a portion is aspirated by each suction stroke of the gas engine, its place being filled automatically by fresh gas from the scrubber. It is to be noted, in connection with the generator, that a part of the necessary air enters through the outer end of the pipe supporting the hand blower, while another part enters by way of the vaporizer, passing over the water therein contained and continuing to the fire grate in the shape of steam. Both these means of admission are under control. The former admits dry air, and the quantities are so regulated as to give the correct proportion for the chemical reactions taking place within the hot zone of the generator.

Railroads in the United States reporting for the first week of October show total increase in gross earnings of 12.2 per cent over last year and 8.2 per cent over 1907.

PREMIUM SYSTEM FOR BELL BOYS, AT THE LODGE & SHIPLEY PLANT.

The Lodge & Shipley Machine Tool Co. of Cincinnati has a system of using bell boys to carry all messages about the shop and to do all running for the foreman to and from the stock and tool room. In handling these boys it was found that while there were apparently enough boys to do the work there were numerous delays in responses to the bell and the men were often forced to do their own running after having lost time waiting for a boy. In order to improve the system it was arranged to keep count of the number of trips made by each boy per day during the week and it was found that the average number of trips per day was about 50. At the close of the week the boys were called together and told that they were making on an average of 50 trips per day and this was all the company would expect of them, but they were told that a system had been arranged by which the number of trips per day for each boy would be counted and for each trip over 50 that the boy made he would receive one-half cent. The operation of this plan has been highly successful and some of the boys are making over 100 trips per day. The result has been also that there are no delays in responses to calls for boys and the system has enabled the management to institute a shop rule that the foreman is not to leave his department under any circumstances and that the boys are to be used for all communications about the shop between the foremen and to the office. The boys are paid at the rate of 9 cents per hour and the saving in time for the more highly paid operatives can be readily appreciated.

Another interesting and novel feature introduced by the Lodge & Shipley Co. is the "factory pass." This consists of a blue circular celluloid badge or button which is pinned upon the coat and bearing the words "Factory Pass, the Lodge & Shipley Machine Tool Co." This has been found of great convenience, as visitors to the plant can be furnished with these badges and can go about the shops unmolested. The absence of the badge at once denotes the straggler who has not come through the office for admission to the plant. Another feature of convenience is that it obviates the necessity for some of the office force escorting strangers and mere curiosity seekers through the shop.

DEVELOPMENT IN THE SIZE AND SHAPE OF FURNACES IN THE LEHIGH VALLEY[1]

As Shown by the Furnaces at the Glendon Iron Works

By Frank Firmstone, Easton, Pa.

In the summer of 1842 my father, William Firmstone, was engaged by Charles Jackson Jr., of Boston, to examine the conditions in the Lehigh valley as a site for blast furnaces using anthracite for fuel. In consequence of his report, he was further engaged by Mr. Jackson to build a furnace for him and his partners on the Lehigh canal, two miles above the mouth of the river at Easton. Work was begun in the fall of 1842, and the first furnace blown in in 1844. The history of the works, therefore, from 1844 to 1887, when my own connection with them ceased, covers only four years less than the whole period of the rise, culmination, and commencement of the decline in the smelting of iron with anthracite in America, the beginning of which, in a commercial sense, may be put in 1839.

Although this paper, as the title indicates, is concerned almost exclusively with the furnaces at Glendon, still what was done there was more or less influenced by current opinion in the district, and even reflects, to some extent, the changes in opinion and practice with mineral fuel the world over.

No. 1 furnace was built of red brick, on four piers, had three tuyeres and fore-hearth and tymp, as was universal with furnaces using mineral fuel until the introduction of Lürmann's cinder-tuyere. The dimensions and profile are shown in Figs. 1 and 2. The first hearth (Fig. 1) was of sandstone; all after were of fire-brick (Fig. 2). The profile was no doubt derived directly from Gibbons' furnace, for it appears from W. Firmstone's note books that in October, 1840, he visited "Gibbons' new furnaces building at Corbyn Hall," and I have an old drawing, made by him, marked "Corbyn Hall, 1841," practically the same as the figure above named in Percy. Although I have called this, with others, the Gibbons profile, essentially the same shape had been used in Sweden long before, and something not very different in England at a still earlier date.

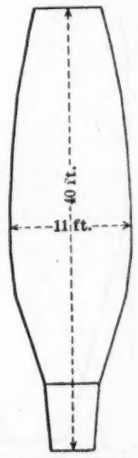
[1]Reprinted from September Bulletin American Institute of Mining Engineers.

Although what had already been done in this country, especially by David Thomas, at the Crane works at Catasauqua, would have warranted building a much larger furnace, Mr. Jackson desired to make the first trial on a very modest scale. No. 1 worked well, and the building of No. 2 was begun in 1844 and the furnace blown in in 1845. This furnace worked very well, used less fuel per ton of iron than No. 1, and naturally made much more iron. On the whole, it was for many years the best furnace at Glendon, especially in the very important point of regularity. The profile, Fig. 3, approximates the Gibbons shape, but the proportions are somewhat different from No. 1 and from Corbyn Hall. The dimensions were: Corbyn Hall, H/d = 3.56; No. 1, H/d = 3.63; No. 2, H/d = 3.21. No. 2 had four tuyeres. Excepting an increase in the diameter at the tuyeres from 4 feet 9 inches to 5 feet, and a consequent slight steepening of the boshes, no important change was made in the profile of this furnace until 1869. Both No. 1 and No. 2 were blown by water power, and the hot blast ovens were fired with anthracite, as was the case at Catasauqua.[2] None of the gas was then utilized at Glendon.

The works were further increased in 1849 and 1850 by tearing down No. 1 and building a larger furnace with five tuyeres on the same site, and by building a third furnace, also having five tuyeres. By this time the use of the waste gases was well understood, and, accordingly, boilers and steam blowing engines were erected to supply No. 3 furnace, and to give more blast to Nos. 1 and 2, and all the hot blast ovens were altered to be heated by the gases. Both boilers and hot blast ovens were raised, some on cast iron columns and some on masonry piers, to nearly the level of the flues, by means of which the portion of gas used was taken from the furnaces, very much as shown in Mr. Thomas' paper, above cited, and which was, in fact, the standard construction for anthracite furnaces in eastern Pennsylvania until the general introduction of closed tops in 1869 and 1870.

In the late '30's and early '40's there

[2]S. Thomas, *Trans.*, xxix., 908 (1899).

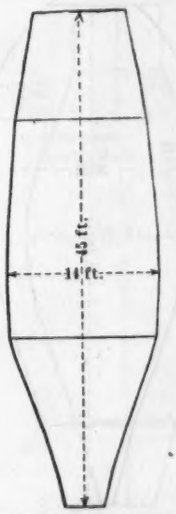


Blown-in, Mar. 15, 1844.
Blown-out, July 17, 1844.
Iron per week, tons, 52.30.
Average grade of iron, 1.68.
Fuel per ton pig, tons, 2.28.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 3.

Fig. 1.—Furnace No. 1.

Blown-in, Sept. 5, 1844.
Blown-out, May 16, 1846.
Iron per week, tons, 57.46.
Average grade of iron, 1.89.
Fuel per ton pig, tons, 2.04.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 3.

Fig. 2.—Furnace No. 1.



Blown-in, May 25, 1845.
Blown-out, Aug. 24, 1847.
Iron per week, tons, 68.36.
Average grade of iron, 3.27.
Fuel per ton pig, tons, 1.95.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 4.

Fig. 3.—Furnace No. 2.

was, apparently, a strong tendency to increase the volume of the furnace, particularly of the upper part, and Gibbons had proved this to be correct within limits by actual trial.[3] The same tendency was probably responsible for making furnaces cylindrical at the widest part for considerable heights, as, for instance, the furnace at the Crane works, shown in Mr. Thomas' paper. In this connection, the following extract from a private note book of W. Firmstone is of interest:

"Liverpool, Sept. 10, 1840, 3:30 p. m., went on change. Saw Mr. Jeavons. Said his furnace in South Wales had blown in with anthracite coal about a week since, doing well. Said they were a month after firing before they got the burden down to blow. Was surprised when I told him that in the States we blew-in a few hours after firing. Said his furnace was 46 ft. high, 12 ft. boshes; 8-ft. tunnelhead; cylindrical for 15 ft.—Dec. 10, 1840. (Carnbrae.) The furnaces are 8 ft. at top; four filling-places, 12 to 15 at boshes, being pretty straight to near the top, then cupped in all at once. This is the common plan in Scotland."

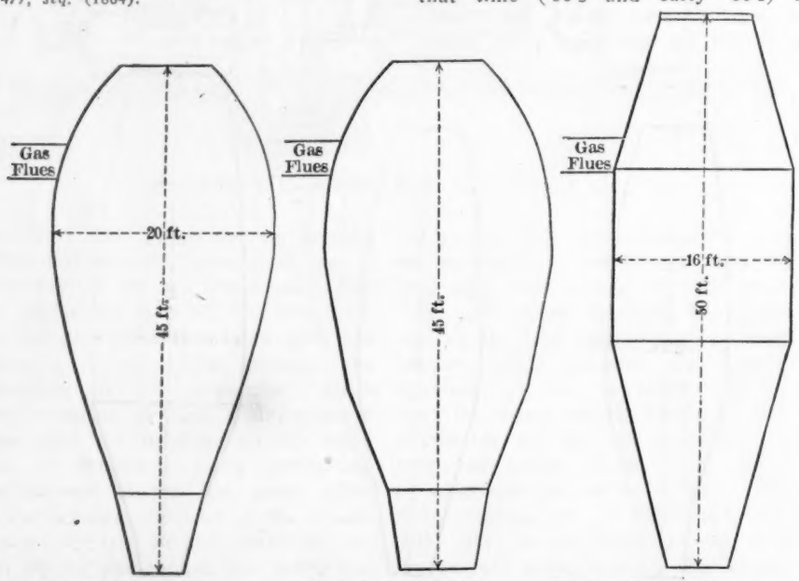
This tendency was carried to the extreme in rebuilding No. 1, as shown by Figs. 4 and 5; but the results were not good, and after two blasts the furnace was raised from 45 feet to 50 feet, and the diameter reduced to 16 feet, Fig. 6, with decided advantage.

There was also a notion at that time, in South Wales at least, that raw coal and anthracite furnaces should be low and of relatively great diameter, no doubt with the expectation that the necessary blast pressure would be less than with higher furnaces of the same cubic capacity. Such a furnace is shown in Percy. This notion was tested in building No. 3, Fig. 7, but the results were so decisively against it that it was soon blown out and altered to the shape shown in Fig. 8.

The ill effects which attend the dumping of the material in the center of an open-topped furnace from a car with a trap door bottom, or from a hopper closed by a small cone which is raised to discharge the materials into a closed-topped furnace, have often been noticed, and clearly traced to the rolling of the coarser part of the charge, especially the larger pieces of fuel, to the walls. It is plain that filling with barrows into a furnace like Fig. 4 or Fig. 7 is not quite the same as dumping exactly in the center of the top, yet it is fairly evident that the great and sudden sidewise movement of the materials, in such cases, will result in an accumulation of the larger pieces at the walls, with the attendant bad effects. This unavoidable defect is one reason, probably the principal one, for the failure of such profiles. So far as I know, they are nowhere in use today. I have no doubt that for good work a furnace should widen downwards from the top at a moderate rate until about the middle of the total height is reached, but special reasons caused the adoption at that time ('50's and early '60's) in eastern Pennsylvania of shapes widening at what now seems an excessive rate. At all furnaces in the Lehigh valley and, so far as I know, elsewhere in the anthracite regions, the gas for hot blast ovens and boilers was then taken from the furnaces by a series of horizontal flues piercing the lining at depths of from 10 to 17 feet below the open tops of the furnaces. By the rolling of pieces of the materials into the mouths of these flues, and by the accumulation of dust in the interstices of such pieces, the flues were greatly obstructed, and unless they were cleaned out at frequent intervals, a very troublesome operation, the flow of gas was greatly diminished or cut off completely. It is plain that this difficulty will be greatly diminished if the inner mouths of the flues come in a place where the furnace walls batter inwards towards the top pretty sharply, and partly at least for this reason, many furnaces built at that time were thus drawn in at the top. Furnaces having this shape were not among those, so far as my own knowledge goes, which did notably good work in respect of fuel consumption and regularity, and the application to them of the cup and cone, with no change in profile, no doubt aggravated the difficulties which at first, in most cases, attended the use of closed tops on the Lehigh.

A much better plan than the excessive contraction at the top was adopted at the Crane works, as early as 1850 according to information given me by S. Thomas shortly before his death. It was also used at the Thomas works, which were built in 1854-55. The furnaces widened from the top downwards at a moderate rate, but grooves, the width of the flues, were formed under each flue, so that a line following the natural slope of the materials drawn from the top of the flue did not cut the bottom, but came into the groove; thus no solid matter but the flue dust could enter them, and they were easily cleaned. The excessive sidewise rolling of the materials was confined to the space in front of each flue instead of occurring all around the circumference. This construction is clearly shown in the drawings of the Thomas works in Percy; also in Wedding. The same plan was used at the raw coal furnace at Canal Dover, O., by David Thomas, Jr., and was employed at some of the raw coal furnaces in the Shenango and Mahoning valleys in the late '60's and early '70's, no doubt derived from Canal Dover.

[3]Percy, *Metallurgy of Iron and Steel*, p. 477, *seq.* (1864).



Blown-in, Mar. 2, 1851.
Blown-out, July 24, 1853.
Iron per week, tons, 114.04.
Average grade of iron, 3.42.
Fuel per ton pig, tons, 1.82.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 5.

Blown-in, Sept. 20, 1853.
Blown-out, Mar. 28, 1855.
Iron per week, tons, 140.69.
Average grade of iron, 4.14.
Fuel per ton pig, tons, 2.03.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 5.

Blown-in, July 1, 1855.
Blown-out, July 1, 1857.
Iron per week, tons, 131.47.
Average grade of iron, 2.72.
Fuel per ton pig, tons, 1.91.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 5.

FIGS. 4, 5, AND 6.—FURNACE NO. 1.

No. 3 furnace was altered to this plan in 1862, but, as Fig. 9 shows, the top was drawn in excessively in order to get sufficiently deep grooves, and, in fact, although the furnace thus altered was an excellent gas-producer and greatly helped the other furnaces in this way, yet the consumption of fuel was always larger than in Nos. 1 and 2, in spite of a greater proportion of mottled and white iron in the product; the working also was decidedly less regular.

No important changes were made at Glendon from the '50's until 1867 and 1868, but at the Thomas works at Hokendauqua, which were built in 1854-55, the furnaces were made 60 feet high. These furnaces are fully represented in the plates in Percy and Wedding above cited. Very full statistics concerning them were published by Prof. John A. Church in 1875.[4] The figures for fuel consumption there given are not directly comparable with those here given for Glendon for like dates, because the furnaces at Glendon were burdened to make as much gray forge as possible, while the object at Hokendauqua was to produce a very soft gray foundry iron. Moreover, the ore mixture at Glendon, consisting of more than half magnetic ores, was richer than that at Hokendauqua, which contained more than half of rather lean brown ores.

No. 5 furnace at Glendon was designed and built in 1867-68. By that time the great saving in fuel which had resulted from increasing the cubic content, and especially from greater height in the furnaces, in the Cleveland district, had attracted general attention. The first design for No. 5 was for a furnace 60 feet high and 18 feet in diameter, but this was changed during construction to 72 feet high and 18 feet in diameter, the profile being as in Fig. 10. This profile differs but little from the Gibbons shape used in No. 1 in 1842, but H/d = 4, and the furnace belongs to Gruner's *elance* type.

No. 5 furnace was blown in in January, 1869, and at once showed marked superiority over the older furnaces, both in fuel consumption and in regularity. In consequence, Nos. 2 and 3 were raised to 50 feet in height, with the profiles shown in Figs. 11 and 12. At the same time, larger and better hot-blast ovens were built, and the combined effect of these changes was a decided but not revolutionary improvement in the results.

Fig. 13 is of No. 2 furnace at the Musconetcong works, Stanhope, N. J., built in 1869-70, following the good work of No. 5 Glendon, and laid out on similar lines and the same proportions (H/d = 4). This furnace always surpassed No. 1 at the same works, even after the latter had been raised from 55 feet to 75 feet in height. I cannot give the exact figures as to output and fuel-consumption, but the latter was very good, although rather higher than for No. 5 Glendon; the ore mixture was different and generally not quite so rich as at Glendon.

In 1871, furnaces Nos. 2, 3 and 5 were blown out because of the coal strike of that year, and advantage was taken of the opportunity to change them from open top and side flue to the cup and cone plan of closed tops. The cup and cone had been applied to the furnaces of the Bay State Iron Co. at Port Henry, on Lake Champlain, in 1865 or 1866, according to T. F. Witherbee.

I have elsewhere described[5] the very unsatisfactory result at first obtained, caused by our ignorance of the proper proportion for the bells.

The '70's of the past century were years of great importance for the study of the blast furnace process, marked as they were by the publication of Bell's great work[6] and that of Gruner,[7] and the many comments on them. In both works, special emphasis was laid on the importance of the action of the gas at comparatively low temperatures in the upper part of the furnace, which, as previously stated, had been announced long before by Gibbons. All this knowledge naturally revived the schemes for furnaces with a great volume in the upper part, by giving experimental support to what had been previously more or less vague conjecture, and as the capital importance of the mode of filling had just been emphasized by the troubles attending the first use of the cup and cone, it was natural to attribute the ill success with the domed section at furnace No. 1 in 1850 and 1852 to the nearly central mode of filling into the relatively small top. Acting on these notions, furnace No. 1 was raised, in 1873, from 50 feet to 63 feet in height, and lined up to a greatest diameter of 18 feet, with a top diameter of 16 feet, as shown in Fig. 14. The filling was effected through six small bell and hoppers disposed in a circle in a large ribbed plate covering the entire top of the furnace. The gas was taken off by a pipe in the center of this plate, which at the same time supported by brackets the six air cylinders which moved the bells.

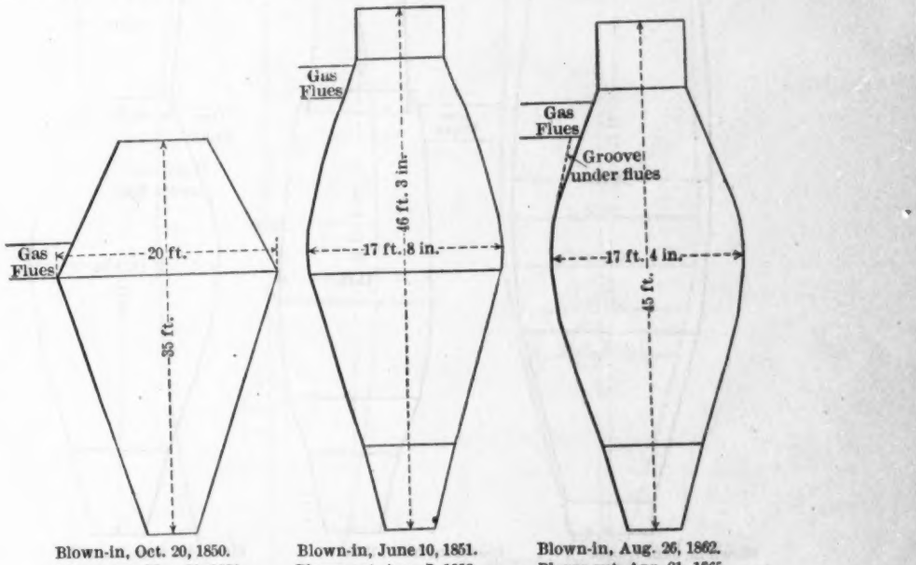
This furnace was blown in in January, 1874, and worked fairly well for some months, but showed no great improvement in fuel consumption as compared with the work done before the alteration, and in this respect it was always far behind No. 5, which

[4] *Trans.*, iv., 223 (1875-76).

[5] *Trans.*, iv., 128 (1875-76); xiii., 520 (1884-85); and xxviii., 370 (1883).

[6] *Chemical Phenomena of Iron Smelting* (1872).

[7] *Etudes sur les Hauts-Fourneaux.*



Blown-in, Oct. 20, 1850.
Blown-out, Mar. 31, 1851.
Iron per week, tons, 103.96.
Average grade of iron, 3.34.
Fuel per ton pig, tons, 2.30.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.
Number of tuyeres, 5.

Blown-in, June 10, 1851.
Blown-out, Aug. 7, 1853.
Iron per week, tons, 109.12.
Average grade of iron, 3.97.
Fuel per ton pig, tons, 2.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 3.
Number of tuyeres, 5.

Blown-in, Aug. 26, 1862.
Blown-out, Apr. 21, 1865.
Iron per week, tons, 154.69.
Average grade of iron, 4.19.
Fuel per ton pig, tons, 1.82.
Blast-temp., 500°-600°.
Blast-pressure, pounds, 4.5.
Number of tuyeres, 5.

FIGS. 7, 8, AND 9.—FURNACE NO. 3.

had practically the same cubic content, about 11,600 cubic feet. In July and August, the furnace gradually worked less and less satisfactorily, and about Aug. 9 it was almost completely scaffolded over, taking for some time only two or three charges per shift. Finally, it was blown out when it appeared that, although nothing was left in it from the tuyeres to a height of about 15 feet above them, at that level it was bridged over, the lower surface of the scaffold being nearly flat and level. The only opening through the scaffold, which was about 10 feet thick, was a somewhat tortuous hole 5 or 6 feet in diameter next the walls on the right hand side when facing the tymp. In trying to remove the scaffold quickly, water was so freely and incautiously used that the slaking of the lime in the suspended mass, by its expansion, completely wrecked the red brick masonry, and no course remained but to tear the furnace down to the foundation.

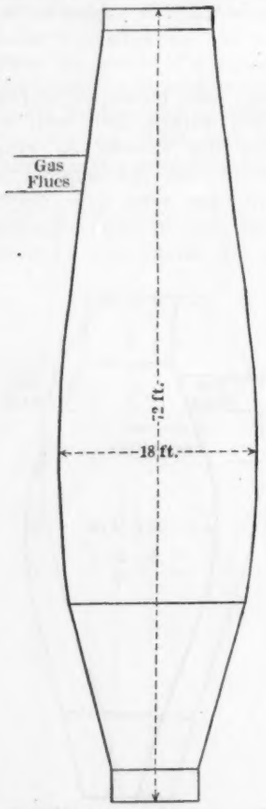
This furnace departed so much from ordinary lines, both in shape and in method of filling, that it is practically useless to speculate on the reasons for its failure. Possibly, probably even, a much greater diameter at the tuyeres would have helped matters. Had we succeeded in clearing out the scaffold without injury to the furnace, as we could have done with more patience and discretion in the use of water, it would have been proper and desirable to make another trial, without altering the shape or method of filling; but during the short blast nothing had been observed to warrant the building of a new furnace on plans so different from those known to give at least good results. Accordingly, in rebuilding, the shape and dimensions shown in Fig. 15 were adopted, for it was not possible to build a duplicate of No. 5 without enlarging the foundations and tearing down adjoining buildings, which it was very desirable not to disturb. The red brick work of the furnace was finished in November, 1875, but the lining was not put in until 1877. The furnace was blown in in August, 1877, and gave excellent results, working regularly and with very low fuel consumption, but, on the whole, no better than No. 5, and perhaps not quite so well. Unluckily, direct comparison over a considerable period is not possible, because, during and after 1877, No. 5 ran much of the time on foundry iron, and on a different ore mixture from that used in No. 1. It never happened, however, when both were running at the same time on forge iron, and therefore on identical ore mixtures, that No. 5 did not do somewhat better as regards fuel consumption than No. 1, and naturally, being considerably larger, No. 5 made rather more iron per week. John Fritz, in the extension of the Bethlehem Iron Works between 1870 and 1875, made the new furnaces 70 feet high and 16 feet in greatest diameter. These furnaces worked well in spite of a very variable iron ore supply.

In 1879 it was decided to replace Nos. 2 and 3 by larger and higher furnaces, the advantages of which had been incontestibly shown by ten years' experience with No. 5. Drawings for this change had been prepared under my father's direction in 1876, which resulted, under the influence of Gruner's work and the unfavorable outcome at No. 1 in 1875, in a design for a furnace 80 feet high and 18 feet in greatest diameter. It differed from No. 5 in having the cylindrical part at place of greatest diameter, 6 feet high instead of 3 feet, and the cylinder at the top 7 feet high instead of 2 feet, as in No. 5. This design belongs to Gruner's *elance* type, H/d being even greater than 4.

It is a good plan to have a cylinder of considerable height at the top, because it decreases the irregularities in distribution which arise when the furnace is not kept very exactly full to the proper stock line.

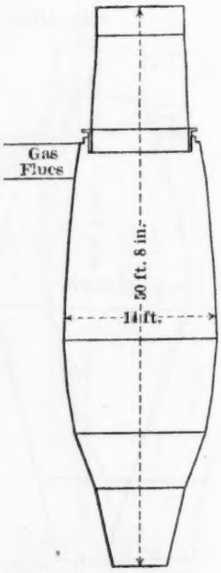
In 1879, in actually rebuilding the furnaces, beginning with No. 3, we had to consider, in addition to the experience prevous to 1875, the excellent results during 1877-78 with the rebuilt furnace No. 1, which had a top 10 feet in diameter for a greatest diameter of 16 feet. It seemed probable that this form contributed to the good working, and that it would be well, therefore, to adopt a top diameter of 11 feet for the new furnace, which is practically in the same proportion to 18 ft. as 10 ft. is to 16 feet.

The final design was for a furnace 81 feet high, 18 feet in greatest diameter, and 11 feet in diameter at top, with the Coingt charger. This furnace was blown in in October, 1880. No illustration of it is given, since it differs from the new No. 2, Fig. 16, only in the diameter at the top, and



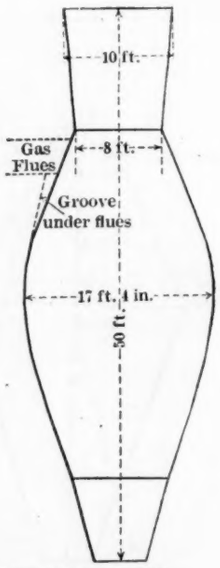
Blown-in, Jan. 7, 1869.
Blown-out, Feb. 28, 1871.
Iron per week, tons, 257.00.
Average grade of iron, 3.72.
Fuel per ton pig, tons, 1.35.
Blast-temp., 500°-650°.
Blast-pressure, pounds, 5.5-6.25.
Number of tuyeres, 7.

FIG. 10.—FURNACE NO. 5.



Blown-in, Nov., 1869.
Blown-out, Apr., 1873.
Iron per week, tons, 182.86.
Average grade of iron, 4.34.
Fuel per ton pig, tons, 1.59.
Blast-temp., 650°-750°.
Blast-pressure, pounds, 4.5-5.
Number of tuyeres, 4.

FIG. 11.—FURNACE NO. 2.



Blown-in, Aug. 22, 1869.
Blown-out, Feb. 6, 1871.
Iron per week, tons, 189.52.
Average grade of iron, 4.61.
Fuel per ton pig, tons, 48.
Blast-temp., 650°-750°.
Blast-pressure, pounds, 4.5-5.
Number of tuyeres, 5.

FIG. 12.—FURNACE NO. 3.

the use of a Coingt instead of the Langen charger. In fact, No. 3 was altered to 10 feet on top and the Langen charger substituted for the Coingt in May, 1882. The change in shape at the top was effected without blowing out, by hanging a cast iron liner, of proper shape, from the lining ring. The change appreciably improved the working of the furnace.

By the time we were ready to rebuild furnace No. 2, we had proved the advantages of the modified Langen charger, and it was, of course, adopted for the rebuilt furnace. No. 2 was blown in in July, 1882.

Neither of the rebuilt furnaces gave really satisfactory results, both showing decidedly greater tendency to scaffold and working irregularly than either No. 1 or No. 5, more especially No. 3, before the change to 10-foot top and the Langen charger. Moreover, the necessary blast pressure was decidedly higher, from 9 to 11 pounds per square inch, as compared with from 6 to 8 pounds for Nos. 1 and 5. This latter disadvantage was greatly diminished by the use of one-eighth of coke, which we began soon after the blowing in of No. 2. A small gain in regularity and an increased output also followed this change.

The new No. 3 was run for a considerable part of the time on foundry iron, hence the figures for fuel consumption and output are not properly comparable with those for Nos. 1 and 2, and are therefore not given.

It was certain that the inferior results at Nos. 2 and 3 were not due directly to the increased height, and any consequent increase in the crushing strain on the materials, a matter about which much has been said and written, but, in fact, very little in the way of exact observation has been published, because, first, the actual height of the column of materials in the new furnaces, allowing for the height occupied by the charging apparatus, was not sensibly greater than it had been in No. 5 during the time it was worked with open top; and second, No. 2 at the Musconetcong works, Fig. 13, always did better than No. 1 at the same works, No. 1 being 75 feet high and No. 2, 80 feet. Moreover, there was a falling-off in the work of all the furnaces at Glendon, after the middle of 1879, which pointed pretty clearly to something which affected all of them in the same manner but in a different degree. The cause was finally discovered in a serious increase in the proportion of very fine magnetic ore from the mines in New Jersey, due to the incautious use of dynamite, and to great irregularity in the percentage of fine and coarse at different times, depending on whether at the time of shipment the stock of ore under the trestles at the mines was increasing or diminishing. By limiting the use of dynamite to narrow work in sinking and driving, which, by the way, did not sensibly increase the cost of the ore, the proportion of fine ore was much reduced, and by screening over 7/8-inch bar screens and shipping the fine and coarse in separate cars, it was possible, within limits, to control the percentage of fine and coarse filled into the furnaces.

At the furnaces a charge was made up of fine or of coarse ore; the two sizes were never mixed in the same round. This was done, at first, because it was much easier to be sure that a certain number of charges of fine ore were filled per shift than that so many barrows in each and every charge during a shift were of fine ore; moreover, it insured that the fine was uniformly distributed around the circumference of the furnace, and not, perhaps, filled all on one side. The resulting improvement was surprising, as is shown from the data given in Fig. 16. It was far greater than could possibly arise merely from the decrease in the percentage of fine material. T. F. Witherbee noted long ago the desirability of regularity in the proportion of fine to coarse ore;[8] E. L. Uehling has strongly insisted on the advantages of sizing and charging each size by itself, and not mixed with another in the same round; and E. Belani has done the same.[9] I can emphatically confirm, from my own observation, all that these authorities say as to the resulting advantages.

The use of sized ore in the other furnaces wrought appreciable improvement, but it was not so remarkable in Nos. 2 and 3.

In spite of the good result shown by No. 2, following the use of a little coke, and especially after sizing the ore, the new furnaces must be regarded as decidedly inferior to Nos. 1 and 5, especially in regularity. The probable cause of this inferiority I do not pretend to indicate, but, considering the good results from No. 2 at Musconetcong, it may be in the

[8] *Trans.*, iv., (1875-76).
[9] *Stahl und Eisen*, vol. xxiii., No. 13, p. 777 (July 1, 1903).

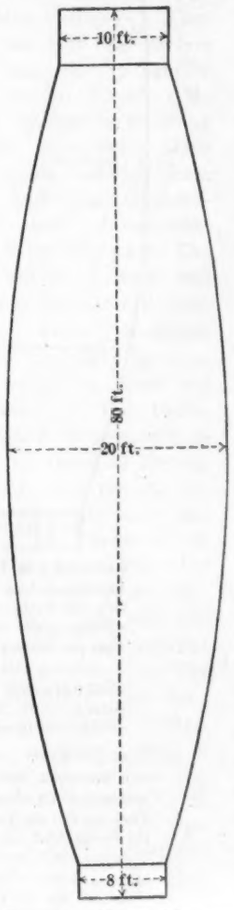
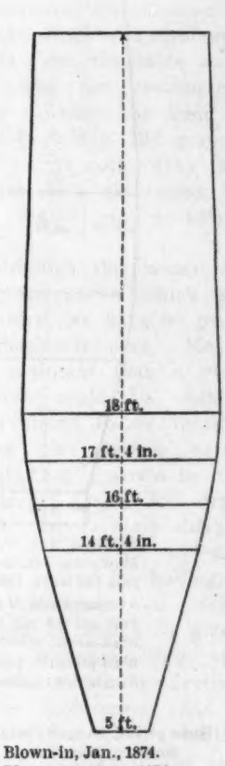


FIG. 13.—FURNACE NO. 2, MUSCONETCONG IRON WORKS, STANHOPE, N. J. 1871.



Blown-in, Jan., 1874.
Blown-out, Aug., 1874.
Iron per week, tons, 214.74.
Average grade of iron, 3.67.
Fuel per ton pig, tons, 1.52.
Blast-temp., 700°-800°.
Blast-pressure, pounds, 4.5-5.
Number of tuyeres, 5.

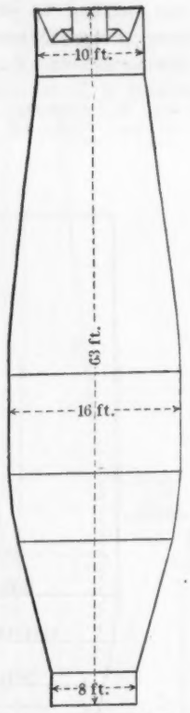
FIG. 14.—FURNACE NO. 1.

too-great ratio of the diameter to the height, H/d being 4.5 in the Glendon furnace, as compared with H/d = 4 at Musconetcong.

The matter seems to show very well the possible cumulative effect of comparatively small errors; that is, in this case the ill-effect of an increase in the fine ore used was not very marked in Nos. 1 and 5, but was serious in Nos. 2 and 3, when to it was added the effect of a change for the worse in the profile.

In comparing the fuel-consumption and the average grade of the iron made after 1875 with that before that year, it is necessary to remember the revolution in the production of finished materials, especially of rails, which followed the development of the Bessemer process. Before 1875 there was always a great market for white-iron for the rail-mills, and it was often made intentionally; after that it was commonly necessary, as far as possible, to avoid producing it, and, in general, the iron used for puddling was much grayer than that previously employed. This of course, tended to increase the average fuel-consumption at the furnaces and to decrease the output.

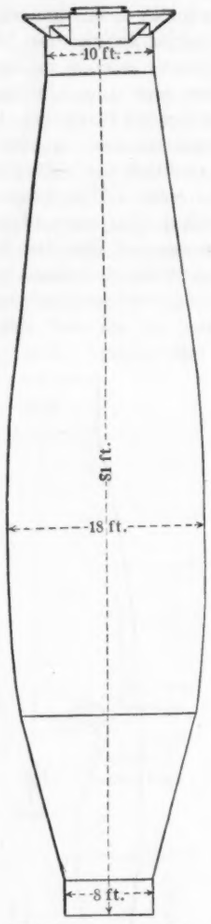
As regards the increased fuel-consumption of No. 1, after 1880, this was probably due, in part, to the very considerable increase in the weekly output, as compared with that from 1877 to 1879.



Blown-in, Aug. 19, 1877.
Blown-out, Oct. 30, 1880.
Iron per week, tons, 304.2.
Average grade of iron, 3.13.
Fuel per ton pig, tons, 1.15.
Blast-temp., 800°-850°.
Blast-pressure, pounds, 6.5-7.5.
Number of tuyeres, 5.

Same profile, Langen charger:
Blown-in, Mar., 1881.
Blown-out, Apr., 1884.
Iron per week, tons, 340.2.
Average grade of iron, 3.01.
Fuel per ton pig, tons, 1.21.

FIG. 15.—FURNACE NO. 1, REBUILT 1875-77.



Blown-in, Aug. 5, 1882.
Blown-out, July 15, 1886.
Iron per week, tons, 412.4.
Average grade of iron, 2.75.
Fuel per ton pig, tons, 1.21.
(118 lb. coke.)
Blast-temp., 800°-850°.
Blast-pressure, pounds, 8-9.
Number of tuyeres, 7.

86 weeks unsized ore (1882-84):
Iron per week, tons, 349.5.
Average grade of iron, 2.53.
Fuel per ton pig, tons, 1.32.
118 weeks sized ore (1884-86).
Iron per week, tons, 458.3.
Average grade of iron, 2.88.
Fuel per ton pig, tons, 1.15.

FIG. 16.—FURNACE NO. 2, REBUILT 1881-82.

THE CORROSION OF IRON.[1]

By J. NEWTON FRIEND, PH. D., M. Sc.

It is well known that iron readily corrodes when exposed to the action of liquid water and air at ordinary temperatures. At first this was regarded as a simple case of oxidation, similar to that which obtains when iron is heated in air.[2] We now know, however, that the reaction is more complex, and several theories have been suggested by way of explanation. Of these there are two only which merit consideration here, for the others have already been proved to be untenable.[3] These are what are known as the acid and electrolytic theories respectively.

According to the former, as its name implies, pure water, oxygen, and iron may remain in contact with one another for an indefinite period without the formation of rust. The presence of a trace of some acid to act as catalyzer is absolutely essential if oxidation of the metal is to begin. As carbonic acid is very prevalent in natural air and water, we may assume that, in all ordinary cases of rusting, it is this acid which acts as the catalyzer, by attacking a portion of the iron, forming ferrous carbonate, $FeCO_3$, or perhaps the soluble ferrous hydrogen carbonate, $FeH_2(CO_3)_2$. This is then converted into rust by the oxygen of the air with the simultaneous liberation of carbon dioxide, which is now free to attack a fresh portion of the iron. We thus see than an infinitesimal amount of carbon dioxide in the presence of water and oxygen would be capable of converting an indefinite amount of iron into rust.

I may, perhaps, at this point be allowed to take exception to Dr. William H. Walker's recent statement[3] that I am a supporter of the so-called "carbonic acid theory of corrosion." This theory implies that carbonic acid is the only acid which can or does effect the corrosion of iron, whereas it should be well known that any acid capable of attacking iron is also effective.[4] In my previous paper, already referred to, car-

[1]Presented at September meeting of the Iron and Steel Institute.
[2]See Friend *Journal of the Iron and Steel Institute*, 1908, No. 11, p. 5.
[3]*Journal of the Iron and Steel Institute*, 1909, No. 1, p. 69.
[4]Such powerful oxidizers as chromic acid are exceptional in their behavior, however, as they render the iron passive. See Friend, *op. cit.*, p. 9.

bonic acid was cited for the reason given above. It is to the general "acid theory of corrosion" that the results of numerous experiments compel me to adhere, and the importance of bearing this distinction in mind has already been emphasized by Dr. Gerald T. Moody in a letter to *Nature* of March 7, 1907.

According to the electrolytic theory of corrosion, on the other hand, the presence of an acid, even in traces, is not essential to the oxidation of the iron, liquid water and oxygen alone being necessary. It is assumed that pure water is ionized to a small but definite extent, and that when a strip of iron comes in contact with it, positively charged iron ions are sent out into the water. Hydrogen ions simultaneously leave the liquid, which latter now becomes virtually a solution of ferrous hydroxide in water. Thus:

$$Fe+2H^{\circ}+2OH'=Fe^{\circ\circ}+2OH'+H_2.$$

Addition of oxygen now causes the ferrous iron to assume the ferric condition, and rust appears.

It might appear at first sight that to decide between the two theories would be a matter of great simplicity, for the presence of an acid can readily be detected by means of certain reagents such as litmus and methyl orange. It has already been pointed out that, according to the acid theory, a single molecule of acid is sufficient to start the process of rusting, and certainly in practice, a very small number would be able to produce a visible effect in a few hours. Remembering that several million molecules of an acid could be placed side by side in line less than one centimeter in length, it will be clear that millions upon millions of such molecules would be necessary to respond to a color test gaged by the naked eye. Hence such a method breaks down at once. We are bound, therefore, to arrive at our conclusions in a more or less indirect manner, and hence arises so much uncertainty. In my previous paper I have given a detailed account of experiments performed in two glass bulbs connected together internally, but hermetically sealed from the air. One bulb contained sodium hydroxide, and pure CO_2-free water was distilled from it on to a strip of pure iron in the second bulb. It is a noteworthy fact that, when the water was distilled from the 1-30-normal sodium hydroxide solution, the iron readily rusted, but when the alkalinity was normal, no rusting took place save at the edges in contact with the glass. This freedom from rust in the latter case is attributed by the advocates of the electrolytic theory of corrosion to the solution, by the distilled water, of some of the alkali from the glass, whereby the number of hydroxyl ions was increased, and the number of hydrogen ions proportionately reduced. But if such was the case, the same source of alkalinity should have prevented the formation of rust, when the 1-30-normal sodium hydroxide solution was used. But it did not, and the explanation is thus seen to break down.

Accordng to the acid theory, on the other hand, a ready explanation is forthcoming. It need not, however, be repeated here, as it has already received full treatment in the paper referred to.

Again, in all experiments hitherto published, in which iron is said to rust in contact with pure oxygen and water, it is easy to show that sufficient precautions have not been taken to make the removal of all traces of acid an absolute certainty. Thus Tilden[5] overlooks the fact that barium hydroxide has a very definite equilibrium pressure of carbon dioxide. He also assumes that, by merely warming an exhausted glass tube, every trace of adherent air can be removed from its surface. But numerous researches of recent date have shown that such is far from being the case. The experiments of Dunstan, Jowett, and Goulding are open to similar criticism.

My experiments show, however, that when all the necessary precautions are taken, corrosion does not take place. It seems to me, therefore, that the balance of evidence is decidedly in favor of the acid theory. In the paper already referred to, after quoting my statement "that the electrolytic theory of corrosion is untenable," Dr. Walker remarks that "if Dr. Friend's observation be correct, which the author does not admit—namely, that this small amount of carbonic acid is necessary to the solution of the iron—this fact does not contradict the electrolytic theory, but can best be explained, and in truth can be explained only, by the use of the electrolytic theory." It is clear that Dr. Walker fails to distinguish between "the electrolytic theory of corrosion" and what is generally understood by the "electrolytic theory" in its wider application. As we have already seen, the former is based on the assumption that water is ionized to a sufficient extent to cause the corrosion of iron in the presence of oxygen, even though no trace of acid is present. My conclusion is that an acid must be present. But I agree with Dr. Walker when he says that the acid theory of rusting is in harmony with the "electrolytic theory," where by that expression he refers to the theory as enunciated by Arrhenius in its widest sense. The criticism is thus seen to be based on a misunderstanding and falls to the ground.

It may be well to call attention at this juncture to the fact that the ionization of water, which forms the base of the electrolytic theory of corrosion, is purely an assumption for which we have no definite proof. Kohlrausch showed many years ago that water offers the greater resistance to the passage of an electric current the more carefully it is purified. A limiting value can, however, be reached, below which the conductivity cannot be reduced. Kohlrausch and Heydweiller distilled water repeatedly in platinum vessels in vacuo, and determined the conductivity as soon as the water was condensed. At 18 degrees Cent. the value was 0.0384×10^{-6} ohms per centimeter from which we calculate the ionic concentration to be 0.78×10^{-7} gramme ions per litre.[6] It is noteworthy that simple contact with air raised its conductivity tenfold in a very short time.

Now although this water was undoubtedly the purest which has ever been obtained, we have no proof that it was absolutely pure. Not a few chemists maintain that if absolutely pure water could be obtained, it would be found to be incapable of conducting an electric current—in other words, that it would be incapable of ionization. Leduc has drawn attention to the extreme difficulty of removing every trace of dissolved gases from water by boiling, and a very few molecules of carbon dioxide would be ample to give to an absolutely non-conducting specimen of water the minute conductivity observed by Kohlrausch and Heydweiller; so that their results may simply be a measure of the extent to which the dissolved gases remain in solution under the special conditions of the experiments. If such is really the case, the electrolytic theory of

[5]Transactions of the Chemical Society, 1908, vol. xciii, p. 1356.

[6]Nernst, "Theoretical Chemistry," translated by Lehfeldt, 1904. pp. 509.

corrosion becomes a myth, whereas the acid theory is unaffected by it.

In this connection I should like to draw attention to the fact that, whilst Dr. Walker's ferroxyl is undoubtedly a useful reagent when rightly used, no experiments with ferroxyl in actual contact with metallic iron can be quoted as deciding between the acid and electrolytic theories of corrosion, for its constituents are complex organic bodies which it is impossible to prepare in an absolutely neutral condition.

From the preceding remarks it will be clear that the whole question resolves itself into this: Is pure water sufficiently active to effect the corrosion of pure iron in the presence of oxygen alone at ordinary temperatures, or is it not? Dr. Walker supplies the answer most decidedly in the affirmative, but my experiments lead me to an opposite conclusion. But either view is in harmony with the electrolytic theory of ionization as we now know it, and the solution of the problem is one of theoretical rather than practical value.

SINKING A REINFORCED CONCRETE MINE SHAFT

At the Morton mine, Hibbing, Minnesota, the Foundation Co., of New York, is sinking a shaft for the Todd-Stambaugh Co., of Cleveland, O., that is an extraordinary piece of work requiring perseverance, skill, energy and capital. The ground through which the shaft is being sunk is a water-bearing gravel and sand 190 feet thick. There are occasionally strata of tough clay, the thickest of which is about 10 feet, near the 160-foot level. There was also one layer of hard cemented conglomerate about 2 feet thick which caused some trouble, as it had to be blasted. Below the 190-foot level is 40 feet of taconite which lies directly upon the iron ore. The shaft is only a few hundred yards from Carson lake and, strange to say, the water level of the shaft is 7 feet below the level of the lake. It would seem that this is due to the fact that the bottom of the lake is covered with an impervious layer of clay.

Shaft Construction.

The shaft is 21 feet inside diameter, circular in form, with wall 4 feet thick, making the outside dimension 29 feet. The concrete portion will be at least 190 feet deep or until an impervious solid stratum is reached. The concrete mixture used is 1-2-4, the sand coming from the shaft as the work progresses. Small gravel, screened from the glacial drift, is used for the rock constituent of the concrete. The mixing is done with a Smith concrete mixer.

The work of construction began October, 1908, and was carried on without interruption during the winter, even though the temperature reached 50 degrees below zero. The shaft was housed and the building heated by steam. The sand was thoroughly heated before using and the concrete mixed with warm water during the cold weather. However, as work progressed it became necessay to have more head room on account of using a larger derrick. Although the shaft is more than 160 feet deep, not a man has been within 75 feet of the present bottom, all the work having been done from the surface. The water is controlled by pumps so that it stands 75 to 100 feet deep all the time. No attempt has been made to pump all the water out.

Cutting Edge.

A steel cutting edge was made of 1-inch plate, the outer portion being vertical and about 7 feet high as shown in the accompanying drawing. The inner portion of the cutting edge has a slope or batter of about 35 degrees. These two steel shells were reinforced by 4 x 4 inch angle iron with webs extending from the vertical plate e to f, which forms the inner plate. This cutting edge was then put in place and the concrete structure begun by filling it with concrete.

Forms.

The concrete forms for the outside were made of ⅜-inch sheet steel, 2½ feet high and reinforced by 4 x 4 inch angle iron at the top and bottom. Two of these sections were placed one above the other and bolted together so as to make the form 5 feet high. It required six of these double sections to reach entirely around the shaft. The inner sections were of the same width but required only five to complete the circle. These were made with 4 x 4 inch angle iron with 1¾ inch wooden planks placed vertically for lagging. Enough of these sections are made so as to enable the operator to use three forms, giving a vertical height of 15 feet. Each section is fitted with lugs and eyes for handling with the derrick. A set of these forms being placed on the cutting edge, the work of filling in the concrete was not difficult. A 5-foot form could be put in place and filled with concrete in a 10-hour shift. As one section of the concrete would set, the lower form would be taken off and placed above. By making forms in this manner it was only necessary to make three complete sets, as each one would be used over and over again.

Reinforcing.

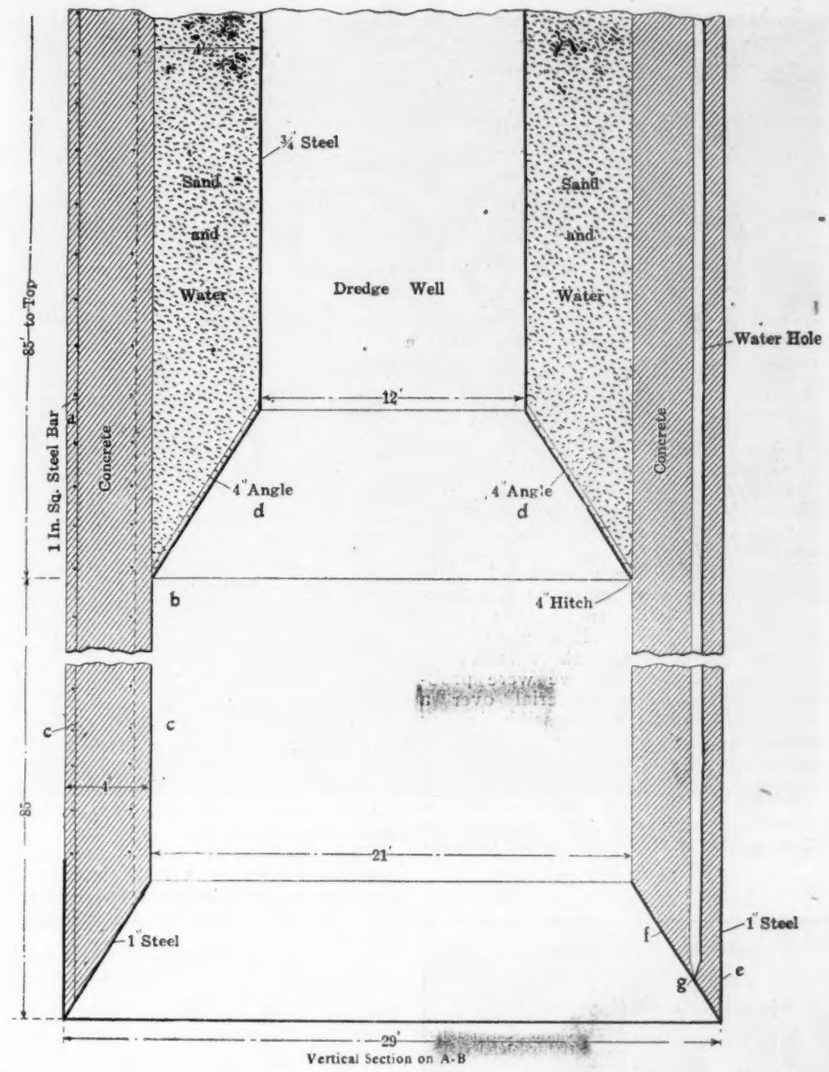
The reinforcing in this shaft consists of two rings of 1-inch square steel bars, placed horizontally, one on the inside of the shaft about 1 foot deep, and one on the outside a like distance from the outer circumference, as shown at c ċ. These rings are placed every 2 feet the entire length of the structure, as shown by dots c ċ, vertical section. There are also two rows of vertical reinforcing bars, a and b, 1 inch square, placed alternately 4 feet apart.

Water Holes.

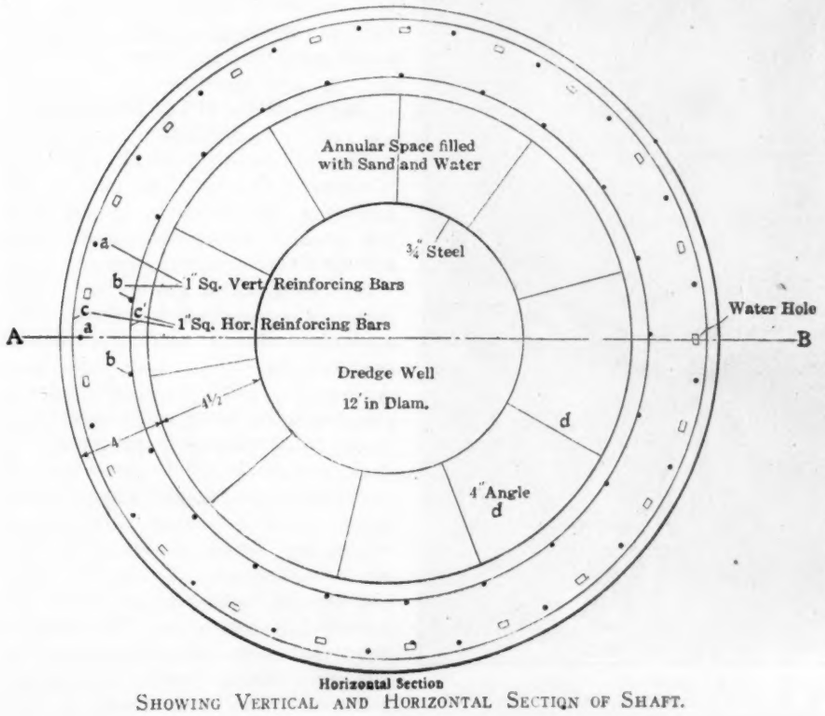
These are 6 inches square and placed 3 feet 10 inches apart, as shown. These were formed by nailing together two 6-inch and two 8-inch boards, in 5-foot sections, to conform with the height of the concrete form. The outlet at the lower end g was made funnel shape, and is only large enough for a 2-inch pipe to pass through the cutting edge. Through these waterways a 2-inch pipe was inserted which extended any required depth into the sand. Water is forced down under a pressure of 100 pounds per square inch at the pump which, with the additional pressure due to head, gives approximately 125 to 140 pounds per square inch. The object of forcing water down through these pipes is to loosen and remove the sand from under the edge and force it out to the center of the shaft so as to enable the dredge bucket to remove it.

Dredge Well.

After the shaft has reached a depth of 85 feet, it was found that the concrete structure was not heavy enough to overcome the skin friction. In order to give it additional weight, a ¾-inch steel shell 12 feet in diameter was placed on the inside which gave a 4½-foot annular space that was filled with 200 tons of pig iron plus sand and water. This well was placed on a cone that had a secure footing



Vertical Section on A-B



Horizontal Section

SHOWING VERTICAL AND HORIZONTAL SECTION OF SHAFT.

on a 4-inch hitch cut into the concrete wall. The bell or funnel part of the shell is reinforced with 4 x 4-inch angle iron. When the shaft is completed this inner shell will be taken out.

Sinking.

All the material was hoisted from the center of the shaft by means of a 1¼-yard clam-shell bucket, weighing 5,400 pounds. While the surrounding country contains a large number of granite boulders the shaft did not encounter any that gave trouble. The clay strata as well as the conglomerate had to be broken beneath the cutting edge and this was done by drilling holes below the concrete through the 6-inch water holes with a churn drill. A charge of 5 to 10 sticks of dynamite was used to loosen up the material. The dynamite sticks were broken and put in a tin cartridge 2½ feet long by 1½ inches in diameter. The lower end was pointed. The cartridge was then attached to a ⅝-inch rod, 6 or 8 feet long, to give sufficient weight to sink it through the water. The charge was lowered through the 2-inch pipe, and when the bottom was reached, the pipe was withdrawn 10 or 15 feet, and the shot discharged by electricity from a dynamo.

During the progress of excavating the sand and gravel, large cavities formed a number of times on the outside of the concrete wall, which would occasionally result in caving. Two different times the inrush of sand and water due to these cavings forced the water to the top of the concrete shaft which at that time was 40 feet above the water level. In order to prevent this holing and hanging up, an occasional shot was discharged in the bottom of the shaft.

Alinement.

Only once during the sinking of the shaft was it actually plumb and this was at about the 80-foot level. At no time was it out of alinement to exceed 8 or 10 inches. This was regulated by cutting more dirt from under the higher side and at the same time adding extra weight. No serious difficulty, however, was encountered along this line. Three times it was necessary to add 1,000 tons of sand upon a temporarily constructed platform at the top of the shaft to give sufficient weight to sink. This sand was placed upon and taken off the platform with the clam-shell bucket. In this way the load could be shifted to suit the condition of the ground.

Cost About $500 per Foot.

The greatest depth that the concrete structure settled in one 10-hour shift was 3 feet 10 inches. The slowest work was 3 or 4 inches in 10 days. One month averaged 19 inches sinking per day and the work to date averages between 6 and 7 inches per 10-hour shift. The contract price for this work is approximately $500 per foot or about $100,000 for 190 feet. The work of the Foundation company is to place the concrete shell on solid rock below the water level. The timbering and equipment of the shaft will be done by the mining company. A well equipped power house has already been completed and the mining company will construct a steel headframe as soon as the concrete work in the shaft is finished.

At the present writing the cutting edge is 160 feet deep, while the concrete shell is a little over 25 feet above the top of the ground. About all the work that remains to be done is the sinking, as the shaft shell is practically complete. The weight of the structure is about 5,000 tons. At least 1,000 tons of sand will be placed on top to assist in the final sinking. The boiler plant required is about 125 horsepower. A Lidgerwood 10 x 12-inch engine is used for hoisting. —*Engineering and Mining Journal.*

FAST ORE HANDLING.

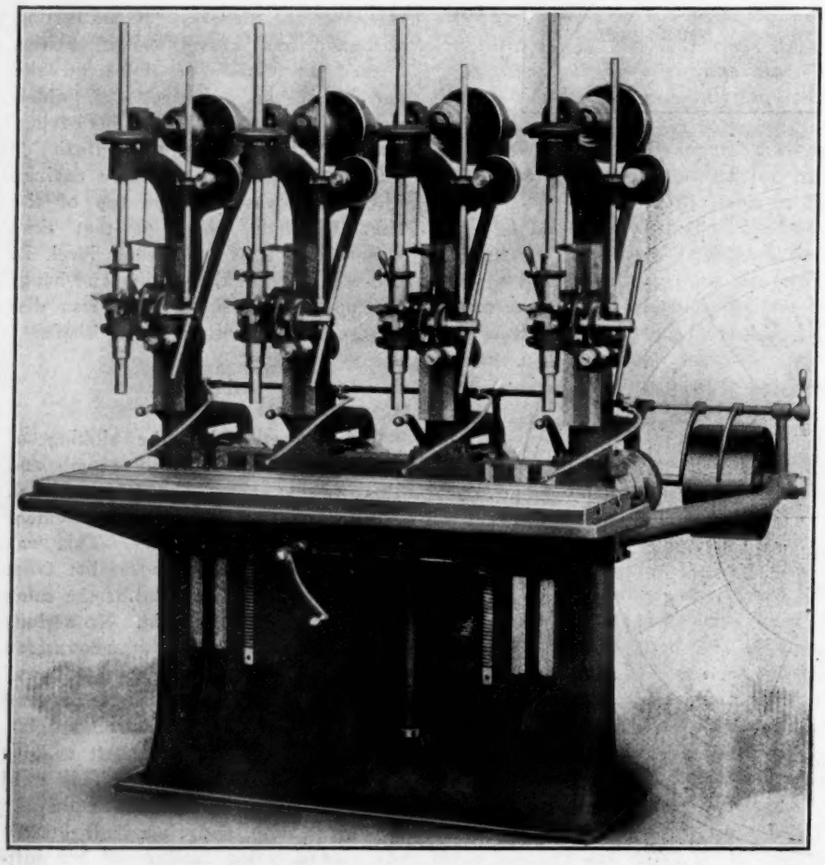
The original notes on the loading pier at Wabana illustrated in the last number of THE IRON TRADE REVIEW, included a memorandum which stated the rate of loading to be 2,000 tons per hour. As this seemed to be an unusually high figure for one spout, THE IRON TRADE REVIEW asked Thos. Cantley, vice president and general manager of the Nova Scotia Steel & Coal Co., for confirmation and his reply is appended:

As shown by the illustrations and description, the loading-pier at Wabana has only one chute or spout, notwithstanding this, the rate of shipment of 2,000 tons per hour has on many instances been exceeded. We think that we are more or less conversant with what can be done by all the principal ore-loading piers both on this continent and abroad, and have long been aware that we were probably putting more material over a single spout than was possible in any other installation in the world. The secret of our success in this direction is not far to seek.

First, we have a shore-pocket in the upper part of a "V"-shaped gulch. This pocket has a capacity of between 25,000 and 30,000 tons. A tunnel is driven underneath this pocket, in which is installed a large and very powerful bucket-conveyor, the buckets being formed out of steel sheets approximate "V"-shaped in section with a capacity of over one ton each, the supporting links being about 42-inch centers. This conveyor, after passing out of the tunnel, is carried on a trestle to the top of the pier, and drops its load directly into a small bin holding from 500 to 700 tons. The spout is attached to the outer face of this bin in such a manner as to give it considerable flexibility, that is, its outer end is capable of moving about 30 degrees on either side of the right-angle line of the dock. On its outer end is attached what we call a trimmer, which device enables us to shoot the ore to either wing of the ship's hold. The conveyor itself will easily convey from the shore-pocket to the small pier pocket at considerably over 3,000 tons of ore per hour, and has done so daily for months. We have repeatedly loaded boats at the rate of over 40 tons per minute. By this we mean that the lapsed time from the moment of beginning to load until all the cargo was aboard, and includes the time lost in shifting the ship so as to bring the spout to bear on four different hatches. In other words, a steamer of 8,000 tons has been loaded in three hours and twenty minutes. This record has been equalled in numbers of cases in vessels of other dimensions.

The method of loading at Lake Superior docks by a large number of hatches is, of course, quite different, and in some cases is a very much simpler one.

Some fast records have been made in loading ore on Lake Superior, notably that on the steamer Corey noted in THE IRON TRADE REVIEW, Oct. 14, 1909, but no such rate has ever been attained with one spout and further consideration only makes the performance more striking.



SHOWING FRONT VIEW OF MULTIPLE SPINDLE DRILL.

NEW MULTIPLE SPINDLE DRILL.

The Cincinnati-Bickford Tool Co., Cincinnati, O., has just put on the market a new multiple spindle drilling machine with fixed centers. Each column is a complete unit in itself, with sliding head, power feed, automatic stop and quick return. The table has also a vertical movement operated by worm and rack gear. As can be readily seen, the spindles are driven by belts and cone pulleys from the continuous shaft at the back, and each spindle drive can be engaged or disengaged independently by means of a friction clutch operated by the handle shown at the left of each column. There are three changes of feed through cone pulleys and worm gear. The spindles are fitted with ball thrust bearings and the sliding heads are counterbalanced. The base forms a tank

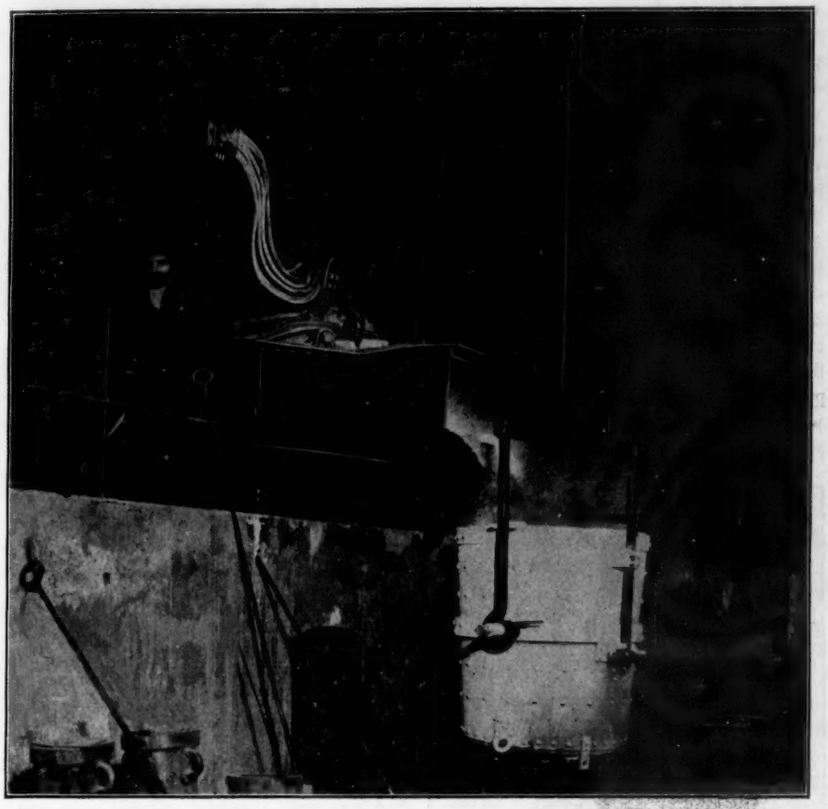


FIG. 1—SHOWING FRONT VIEW OF GIROD ELECTRIC FURNACE.

or reservoir for lubricant, which is supplied to each spindle by a pump at the back of the machine. Any number of spindles can be provided, either plain or with power feed.

THE GIROD ELECTRIC FURNACE.

The accompanying illustrations show the 12½-ton Girod electric furnaces recently installed at the plant of Cie. des Forges et Acieries Electriques, Paul Girod, Ugine, Savoie, France. There are two 12½-ton and two 3-ton Girod furnaces in operation at these works, with two 3-ton furnaces under construction. Fig. 1 is a front view and Fig. 2 a rear view of the 12½-ton furnace.

At the Ugine works, the charge is usually composed of 75 to 80 per cent of heavy scrap material and 20 to 25 per cent of unsorted turnings. In France, a large quantity of inferior Thomas steel is used, and this material, when placed in the Girod furnace, usually contains: Carbon, 0.30 to 0.40 per cent; silicon, 0.10 to 0.30 per cent; manganese, 0.40 to 0.80 per cent; phosphorus, 0.08 to 0.12 per cent; sulphur, 0.08 to 0.10 per cent. From this charge, every kind of steel is produced, from the softest carbon steels containing approximately: Carbon 0.05 to 1.80 per cent; silicon, 0.10 to 0.25 per cent; manganese, 0.15 to 0.30 per cent; sulphur, 0.01 to 0.02 per cent; and phosphorus, 0.01 to 0.02 per cent, to the hardest nickel, nickel chrome and nickel-vanadium steels, molybdenum and tungsten steels, high speed steels, etc.

For further particulars of the Girod electric furnace see page 1027 Vol. XLIV THE IRON TRADE REVIEW.

The photographs are by courtesy of the C. W. Leavitt Co., New York.

FIG. 2—SHOWING REAR VIEW OF GIROD ELECTRIC FURNACE.

REINFORCED CONCRETE FROM THE MACHINE TOOL INDUSTRY VIEW POINT.

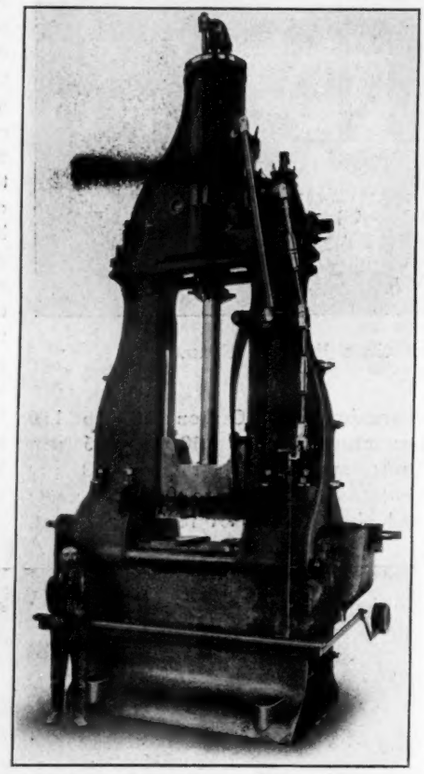
At the convention of the National Machine Tool Builders' Association, New York, Oct. 13, Mr. J. P. H. Perry, of the Turner Construction Co., New York, delivered an address on the above subject. Mr. Perry treated the question from the standpoint of the contracting engineer, whose business it is to consult with owners who contemplate new buildings, and convince them of the worth of this material. The speaker said that, in the course of several years' experience he had found that certain properties of reinforced concrete are either misunderstood or unappreciated by those responsible for decision as to the class of construction to be employed in new buildings. The average industrial executive when asked to consider concrete construction for prospective buildings was most prone to ask whether or not concrete is an experiment.

Passing over the experience which

several thousand industrial buildings, in all lines of business, offered in answer, Mr. Perry came to the particular application of reinforced concrete in buildings for manufacturing in general, and for the machine tool industry in particular. The advantages which this type of building offer in speed of construction was pointed out as compared more particularly with all-steel construction, due in a large part to the fact that the steel required for reinforcement could usually be had out of stock, whereas the time required for delivery of rolled and fabricated steel might be anywhere from six weeks upward, and the cement, sand, lumber, etc., are usually available at once. A number of instances of this were cited, and it was also pointed out that it was not necessary to have complete detailed drawings of the entire building before construction was undertaken, as in the case of steel buildings.

The load carrying capacity is one of the most important points in the machine tool industry. Mr. Perry pointed out that reinforced concrete buildings are noted for their strength and their ability to safely carry unexpected loads, and said that in several buildings which had been constructed by his company, floors have been designed to carry 600 pounds per square foot, and have been subjected to 1,500 and 2,000 pounds live loads, without the slightest indication of injury or increased deflection. A remarkable instance of the strength of reinforced concrete floors under severe conditions is furnished by an embossing press on the seventh floor of a paper goods factory in Brooklyn, where the floors were designed for live loads of 250 pounds per square foot. The press in question weighs 16 tons and rests on a base 3 x 6 feet, or nearly one ton per square foot, without any noticeable deflection, and without any precautions having been taken to distribute the load. Another remarkable instance of the strength of reinforced concrete floors is taken from a dying establishment in Wilmington, Del., in which the floor span between the beams is 10 feet 6 inches and the thickness of floors 6 inches. This floor was unintentionally subjected to an impact test by a piece of granite falling 32 feet and striking on one corner, giving a concentrated blow over an area of 6 x 6 inches. The piece of granite was 6 feet 6 inches long, 18 inches wide and 8 inches thick, weighing 173 pounds per cubic foot. The accident occurred four years ago and the floor is still in use.

The question of vibration in a building was also treated, as practically all industrial executives consider it the chief factor in determining its use. It was stated that the majority of owners of reinforced concrete buildings are well satisfied that they get less vibration with this form of construction than with any other type. As an instance of the stiffness of concrete buildings, a 9-story plant, 231 x 200 feet, in Brooklyn was cited. It was stated that the seventh floor of this building is filled with presses operating rapidly and with very heavy reciprocating parts, yet a coin can be stood on edge anywhere on their base frames and will remain in that position indefinitely, which may be deemed a fair test.



ERIE FOUNDRY CO. STEAM DROP HAMMER.

The objection to concrete floors as being severe on apparatus or in producing dust was also dealt with, and the statement was made that the prejudice against concrete floors for these reasons has largely disappeared. The questions of dampness and increased light, freedom from deterioration, etc., were also dealt with. In considering costs of different types of buildings the speaker said that besides first cost, the questions of insurance, maintenance, depreciation, amount of available light, freedom from vibration, elimination of vermin, fire-proof value, etc., should all be considered, and that in most cases the concrete building would be found to be the most economical.

LARGE STEAM DROP HAMMER.

Mention was made in the Oct. 7 issue of THE IRON TRADE REVIEW of a large steam drop hammer which had been installed at the Rambler automobile factory in Kenosha, Wis., for drop-forging crank shafts, connecting rods, etc., and we are now able to present a view of this hammer, which was built by the Erie Foundry Co., Erie, Pa. The hammer is rated as 3,500 pounds, which is the weight of the falling parts; the anvil block weighs 70,000 pounds, and the total weight of the machine is 98,000 pounds. The spring piston stop at top of cylinder, which is designed to protect the cylinder head against damage from careless handling or piston rods breaking or pulling out of crosshead, will be noted at once. In addition to the tie rods at top and bottom of frames, a steel tie plate is fitted under cylinders on the heads of frames.

Adjusting screws, which can be seen at the side, are fitted for lining up the dies, enabling this operation to be performed quickly.

The ram, crosshead and sow-block are forged of open-hearth steel. As will be seen from the photo, this hammer is nearly 25 feet high and the builders advise us that they have on order a still larger hammer rated at 5,000 pounds for an Erie concern.

NEW CATALOGS.

OVERHEAD CARRYING DEVICES.—In their 96-page, 6 x 9 inch catalog No. 77 the New Jersey Foundry & Machine Co., 90 West street, New York, describe their line of overhead track and travelers; hand, electric and pneumatic hoists; buckets; cranes; cars and miscellaneous transportation equipment. They also exhibit a line of general iron and construction work, including high pressure hydraulic gates, lighthouses, towers, etc.

CHUCKS.—The Skinner Chuck Co., New Britain, Conn. 1909 Price List, 4 x 7¼, 48 pages. Lathe, drill and planer chucks, face plate jaws, reamer and assembling stands, and drill press vises. Each different style of chuck is illustrated by half-tone cuts. The company also makes special chucks for holding automobile gears and parts, in addition to those shown in list.

FORGINGS.—The Steel Car Forge Co., Pittsburg, are sending out their 1909 catalog, 128 6 x 9 inch pages in board covers, describing their line of forgings for freight, mine and street railway cars, motor trucks, etc., besides innumerable special forgings, together with a line of machine and carriage bolts and pressed steel specialties, turnbuckles, chains, etc. The catalog is very well gotten up and profusely illustrated. Sketch dimension sheets are furnished for an almost endless line of shapes.

EXPORTS GAIN,

APPROACHING THE RATE OF 1906-7.

Iron Ore Imports Heavy, Promising Record Year—Values of Tonnage and Non-Tonnage Exports Compared.

August exports of iron and steel tonnage lines, totalling 105,694 gross tons, show an increase of 5,000 tons over July, but fall short of May and June. The general showing compared with previous months in the year is good, as the average of the seven months preceding August was 96,513 tons a month, August showing a gain of 9.5 per cent over this average.

Compared with the movement of a year ago a very substantial gain is shown, as exports in August of last year were 86,244 tons, the gain being nearly 20,000 tons. The total for the first eight months of this year, 781,283 tons, represents a gain of almost 130,000 tons, or 20 per cent, over the corresponding period last year. Thus our exports are gradually increasing, and have recovered much of the ground lost since the record years 1906 and 1907. The comparison with these two years, the best on record, is as follows:

TONNAGE EXPORTS.

Eight months, ending August.	Gross tons.
1906	927,205
1907	861,664
1908	652,952
1909	781,283

The gains in exports in the eight months of this year over the similar period in 1908 are fairly well distributed. The only decreases are in structural material, from 81,910 to 60,960 tons, in tin plates, 11,331 tons to 6,215 tons, and in hoop, band and scroll, 3,148 to 2,045 tons. All other lines showed gains, the most marked in point of tonnage being rails, which increased from 138,787 to 166,306 tons.

Heavy Ore Imports.

August showed remarkably heavy imports of iron ore, as will be seen from the following statistics:

IRON ORE IMPORTS. GROSS TONS.

1909.	
January	105,233
February	61,749
March	108,676
April	74,782
May	97,393
June	124,714
July	172,316
August	209,855
Eight months, ending August.	
1907	855,657
1908	424,963
1909	954,718

Iron ore imports in the past six calendar years have been as follows:

1903	980,440
1904	487,613
1905	845,651
1906	1,060,390
1907	1,229,168
1908	776,898

The iron ore import movement has evidently reached record proportions, since the previous record for a calendar year was 1907, with 1,229,168 tons, and the first eight months of this year have passed the first eight months of 1907 by about 100,000 tons. However, 1907 stands as the record year by only a relatively small margin. As far back as 1890 we imported 1,246,830 tons, while in 1902 we imported 1,165,470 tons. Imports were lighter in the intermediate years, dropping to less than 200,000 tons in 1894 and 1898.

The statistics of iron and steel imports are colorless, no special movement being shown. The pig iron imports in August were 10,000 tons, but this designation covers ferro-manganese, spiegeleisen, ferro-silicon and various special grades of pig iron. In the fiscal year 1907 we imported 176,965 tons of ferro-manganese and spiegeleisen alone, so that imports of pig iron of 10,000 tons in August do not indicate any movement in ordinary grades of pig iron.

IRON AND STEEL EXPORTS. GROSS TONS.

	August		Eight months, ending August,	
	1908.	1909.	1908.	1909.
Scrap	1,612	729	14,437	22,050
Pig iron	3,333	6,193	26,452	37,805
Billets, sheet bars, etc.	6,865	9,309	79,015	84,110
Wire rods	153	308	3,904	9,699
Rails	27,608	26,739	138,787	166,306
Structural iron and steel	10 409	7,254	81,910	60,960
Bar iron	659	936	4,806	8 937
Steel bars	2,812	6,111	28,639	44,721
Sheets and plates.	10,767	15,816	67,162	107,735
Tin plates	164	618	11,331	6,215
Hoop, band and scroll	535	322	3,143	2,045
Wire	8,780	10,954	90,081	101,221
Wire nails and spikes	1,953	2,813	18,430	18,939
Cut nails and spikes	1,125	724	5,293	6,108
All other, including tacks	399	1,020	3,008	5,299
Pipes and fittings	9,016	15,848	76,554	99,124
Totals	86,244	105,694	652,952	781,823

TOTAL IRON AND STEEL EXPORTS, GROSS TONS.

	1907.	1908.	1909.
January	102,630	74,353	70,089
February	64,728	81,773	84,860
March	112,787	96,681	94,522
April	132,792	93,285	100.903
May	91.543	64,020	109,977
June	92,996	69,779	114,721
July	122,249	86,806	100,670
August	148.792	86,244	105,694
September	114,819	76,727	.....
October	123,170	85,668	.....
November	116,308	71,028	.....
December	86,019	77,656	.....
Total	1,301,979	964,266	781,283

IRON AND STEEL IMPORTS. GROSS TONS.

	August		Eight months, ending August,	
	1908.	1909.	1908.	1909.
Scrap	260	2,125	3,262	4,377
Pig iron	5,200	10,422	56,941	87,222
Billets, bars and steel n. e. s.	963	1,335	6,610	10,419
Wire rods	1,390	1,238	7,796	7,606
Rails	84	2	1 094	382
Structural	86	265	1,472	3,914
Bar iron	971	1,380	14,316	9,944
Sheets and plates.	187	282	1,524	2,225
Tin plates	4,014	5,071	48,185	40,042
Totals	13,155	22,120	141,200	166,131

Our Non-Tonnage Exports.

The total value of all exports of iron and steel and manufactures there-

IRON AND STEEL EXPORTS—CALENDAR YEARS.

	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
Scrap, pig, billets	$ 8,551 398	$ 2,220,003	$ 731,537	$ 653,038	$ 7,311,777	$ 5,576,993	$ 5,767,870	$ 3,921,888	$ 3,793,450
Rails	10,895,416	8,628,781	1 902,396	937.779	10,661,222	7,310,029	8,903,411	10,411,072	6,021,549
Other tonnage lines	23,071 258	18,201,662	18,362,517	18,862,022	24,578,110	29,217,326	37,543,808	45,713,261	33,582,324
Total tonnage lines	$ 42,518,072	$ 29,050,446	$20,996,450	$20,452,839	$ 42,551,109	$ 42 104,348	$ 52,215,089	$ 60,046,221	$ 43,397,323
Hardware lines	$ 11,474,451	$ 9,973,505	$12 580,186	$13,737,846	$ 13,097,856	$ 14,668,223	$ 17,354.076	$ 19,675,917	$ 15,510,754
Stoves and ranges	567,006	656,177	868,695	981,475	810,971	1,019,757	1,317,929	1,326,505	1,036,527
Cash registers	860,622	931,984	1,220.791	1,825,503	1.871.100	2,210,990	2,664 113	2,477,425	2,229,474
Electrical machinery	5,286 224	5,623,442	5,937,643	5,104,502	6,675,766	7,409,242	8,274,753	9,735,230	6,956,722
Laundry machinery	475,952	517,842	519,065	552,291	512,542	646,654	652,331	711,912	627,368
Metal working machinery	6,210,594	3,003 871	2,863,709	3,316,038	3,483,232	5,625,044	7,913,327	10 142,835	5,205,606
Mining machinery	.....	.....	.....	.....	.....	.....	.....	6.125,951	3,862,973
Printing presses, etc.	1,295 379	790,559	843,613	1,143,122	1.450,993	1,500,603	2,047,773	1 802,458	1,562,948
Pumping machinery	2,750,312	2,024,937	2,516,300	2 729,288	2,733,625	3,737,774	4,122 703	3.722,847	2,827,428
Sewing machines	4,510,221	3,749,334	4,606,794	5,340.474	6,019 161	6,474,992	7,845.228	8.472.176	6,204,436
Shoe machinery	1,023,929	1,059,145	788,377	834 995	1 240 096	1,383.005	1,470 900	1 219,013	1.029,610
Typewriters and parts	2,736,435	2 937,762	3,575,909	4,537,396	4,138,651	5 102,980	5,694,244	6,664,164	6,318,219
Windmills	.....	.....	.....	.....	.....	.....	.....	1,216.235	1,305,878
Wood working machinery	.....	.....	.....	359,338	628,714	853,426	936.288	1,386,881	1,069.057
All other machinery	23,852,046	18,665,182	20,930.519	20,068,810	22.918 952	25,512,579	29,612.028	26.688,256	22,224.564
Locomotives	4,468.527	4,051,434	3,966.007	3,099.521	4,697 340	5,573 080	7,430.277	9,080,337	6,319 309
Stationary engines	873.509	861,864	672 957	714,508	1,099 690	1,184,784	1,931,038	2,489,691	3,119 813
Boilers, etc.	1,880,023	1,522,053	2,455,706	2,290,491	2 008 385	2,501.068	2,659,188	3.252,209	3.285,371
Other manufactures	18,850,178	17,115,038	12,549,315	11 947,378	12,615,430	15,419,964	18,414,303	20,830,518	17,019,734
Total non-tonnage	$ 87,115,408	$ 73,484.129	$76.895.586	$78.583,026	$ 86,002,504	$100.824.165	$120 340 499	$137.020,560	$107,715 791
Grand total	$129,633,480	$102,534 575	$97,892,036	$99,035,865	$128,553,613	$142,928 513	$172,555,588	$197,066,781	$151,113,114

of, not including iron ore or agricultural implements, has been as follows:

August, 1908	$12,058,561
August, 1909	14,136,219
Eight months, ending August.	
1907	129,400,247
1908	105,258,962
1909	100,955,684

In presenting a view of our iron and steel exports it has been customary to set down the tonnages of the tonnage lines, as it is more interesting to the iron and steel trade to deal with tonnages than with values, and then to set down the government totals of values of all exports of iron and steel and manufactures thereof. This grand total as given in the government statistics includes the value of the tonnage lines. Such comparisons, therefore, tell practically nothing of the relative value of the tonnage and non-tonnage exports. In order to show clearly the real distribution of our iron and steel exports, the accompanying table has been compiled. It does not appear that anything on so large a scale has ever been attempted before in statistical presentations, but the picture is certainly instructive. To avoid making the table too cumbrous, the tonnage lines are grouped into three classes, the first representing the raw materials, scrap, pig iron and billets, sheet bars, blooms, ingots, etc. (not wire rods), the second rails, and the other all the other products, such as plates, structural material, bars, wire, nails, pipes and fittings, etc., which are represented in the regular tonnage table. The sum of these represents the value of the tonnage lines as ordinarily reported.

In the second division of the table the manufactures of iron and steel are given. The government classification is followed as a rule, but some combinations were made to avoid prolixity. Hardware, saws, tools, cutlery and firearms are grouped as "hardware lines", while with boilers are included fire and traction engines.

Our exports of non-tonnage iron and steel products are probably larger than would generally be assumed. Some lines show up remarkably well. It is not surprising to find our exports of locomotives totalling more than $6,000,000 in the last calendar year, but it is interesting to observe that such small lines as sewing machines and typewriters each show an equal total. Each one of these lines showed a greater value in 1908 than did the 196,510 tons of rails we exported in that year, while the three lines, plus hardware, cutlery, firearms, etc., made a slightly larger total than did all tonnage lines, excluding rails, crude steel and pig iron.

The distribution of tonnage and non-tonnage lines has been as follows in calendar years:

	Tonnage.	Non-Tonnage.	Total.
1900	$42,518,072	$ 87,115,408	$129,633,480
1901	29,050,446	73,484,129	102,534,575
1902	20,996,450	76,895,586	97,892,036
1903	20,452,839	78,583,026	99,035,865
1904	42,551,109	86,002,504	128,553,613
1905	42,104,348	100,824,165	142,928,513
1906	52,215,089	120,340,499	172,555,588
1907	60,046,221	137,020,560	197,066,781
1908	43,397,323	107,715,791	151,113,114

The corresponding values in the first eight months of this year have been as follows:

Tonnage	$ 31,985,799
Non-tonnage	68,969,835
Total	$100,955,684

Assuming exports in the remaining four months of the year to continue at the same rate, the calendar year totals will be as follows:

Tonnage	$ 48,000,000
Non-tonnage	113,000,000
Total	$161,000,000

In that event both lines will show a measurable increase over 1908, and will fall considerably short of the two high years 1906 and 1907, comparing very favorably with preceding years.

It is interesting to note that the value of tonnage exports this year shows only a very moderate gain, about $5,000,000, over 1900 and 1904, while the non-tonnage lines show a gain of $25,000,000 over each of those years.

NEW OPEN-HEARTH WILL OPERATE.

The Wheeling Mold & Foundry Co., Wheeling, W. Va., this week will start operations in a new 20-ton open-hearth furnace which has been added to its plant. The new capacity will place the company in a position to furnish a general line of steel castings as well as iron, and steel rolls in addition to chilled and sand rolls.

LATROBE STEEL CO. DISSOLVED.

Stockholders of the Latrobe Steel Co. at a recent meeting in Philadelphia voted to dissolve the corporation. The Railway Steel Springs Co. bought out the Latrobe company in 1905, since which time the company's affairs have been in course of adjustment.

SALE AGAIN POSTPONED.

The sale of the Passaic Steel Co., originally set for Nov. 12, has been postponed to Nov. 19, in order to comply with certain legal requirements. The upset price is $250,000. At present the structural shop is rushed with work.

MILL OPERATIONS OF THE AMERICAN SHEET & TIN PLATE CO.

The complete report of mill operations of the American Sheet & Tin Plate Co. as of Oct. 20 shows a steady increase in tin mill operations, but a slight loss in sheets due to a broken engine at the Struthers plant, where three mills were rendered idle. The operations are as follows:

Tin plants.	Serviceable equipment.	Mills operating Oct. 20.
American	28	18
Cambridge	7	7
Chester	7	7
Crescent	6	6
LaBelle	10	—
Laughlin	23	—
Monongahela	8	8
National	25	25
New Castle	25	19
Pennsylvania	8	8
Pittsburg	8	8
Sabraton	10	10
Sharon	30	20
Shenango	20	18
United States	11	6
Total	221	160 or [72 per cent

Five mills of the United States plant which are off because of a disabled engine will resume next week.

Sheet plants.	Serviceable equipment.	Mills operating Oct. 20.
Vandergrift	37	36
Leechburg	11	11
Hyde Park	6	6
Saltsburg	4	4
Aetna Standard	23	—
Canal Dover	11	11
New Philadelphia	12	12
Canton	5	—
Dresden	4	4
Guernsey	11	11
Mercer	5	5
Midland	7	7
Piqua	4	3
Old Meadow	8	8
Scottdale	9	9
Struthers	6	3
Wellsville	10	9
Woods	13	12
Total	186	151 or [81 per cent

Two additional mills are being put on at Canton and three others will be started next week. One Vandergrift is off for repairs, one Woods is obsolete and one Piqua is not in shape to operate.

STEAM PUMP BONDS.

The statement is made on behalf of the International Steam Pump Co. in connection with the offer of the unsold portion of its bonds that no dividends on common stock shall be paid unless the quick assets shall reach at least $8,000,000 above current liabilities. Subscriptions are being received in both New York and London.

An Explanation.—The announcements recently made concerning the Lackawanna Bridge Co. were inaccurate because of telegraphic errors. The New York office is located in the Hudson Terminal buildings, 50 Church street, and is in charge of Jason Paige.

NEWS FROM MANY INDUSTRIES

(In order to assist the post offices in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

Missouri Zinc & Lead Mills Co., of St. Louis; $50,000; by J. A. Webb, Jesse French, H. B. McClarin, and others.

The Ballin Water Tube Boiler Co., Portland, Ore.; $50,000; by Fred A. Ballin, Arthur Langguth, Edward G. Gordon.

The Railway Foundry Co., Chicago; $30,000; foundry and machine shop; by P. H. Moynihan, W. W. Smith, George W. Ross.

Fort Worth Wire Fence Machinery Co., Fort Worth, Tex.; $20,000; wire fence machinery; by A. J. Parks, J. G. Reeves and T. B. Blewett.

Kaltenbach Sheet Metal Works, Chicago, $6,000; general metal manufacturing business; by F. Kaltenbach, M. Kaltenbach and G. A. Smith.

H. & A. Allan, Ltd., Montreal, $300,000; build ships and carry on a general business in shipping; by Sir Montagu Allan, Hugh A. Allan and B. J. Allan.

Farrell & McCarthy, Ltd., Toronto, capital $20,000, construction and electrical engineers, etc.; provisional directors, Charles Earl, Charles F. Crouch and Wm. E. Harris.

Superior Machinery & Supply Co., New Orleans; machinery and supplies; P. J. Shouvlin, H. L. Church, Eugene Buckmaster and others; $50,000 capital.

The Vogel Co. of Canada, Montreal; $20,000; by J. J. Keyes, J. Ogilvie, W. J. O'Brien, A. H. Chave and G. R. Drennan; to manufacture automatic sprinklers.

The Rummel Machine Screw Co., Cleveland; by Richard E. Rummel, Henry C. Leeseberg, H. T. Rummel, Elsie T. Rummel and Lizzie M. Leeseberg; $20,000 capital.

The Feval Enamel Insulated Wire Co., Chicago; electrical supplies; $12,500; by C. I. Backus, A. M. Higgley, F. L. Silvertson, H. P. Simonton, 1602 Ashland building, Chicago.

The High Grade Metal Co., Brooklyn; castings of various metals; $50,000; by William C. Milner, Bertha O. Duck, Blanche E. Phillips, all of 392 Greenpoint avenue, Brooklyn.

The International Steel Tie Co., Altoona, Pa.; $200,000; by William P. Day, Venantim A. Oswald, Altoona, Pa.; John J. O'Donnell, Cleveland, O., and Harry Emmonds, Wilmington, Del.

O'Herron, Hartmann & Co., Terre Haute, Ind., $10,000; sheet metal manufacturers and dealers; by G. F. O'Herron, A. E. Hartmann, J. A. O'Herron, Herman Dierking and Blanche E. O'Herron.

The Bahman Iron Works, Cincinnati; $100,000; by Edward J. Harth, Robert F. Bahman, William Bahman, F. Lawson Moores, B. W. Bahman, Jefferson Livingston, W. W. Cooney and Fred Holz.

Allan Hills Edge Tool Co., Ltd., Galt, Ont., capital $100,000, to manufacture machinery and tools; provisional directors, Allan Hills, John W. Porteous, E. T. Malone, A. L. Malone and Harry Vigeon.

The Riverview Bronze & Mfg. Co., Buffalo; engines, machines, cars, etc.; $50,000; by Palnek F. Woods, 464 East Utica street; Ray P. Deardorf, 419 Hoyt street; William R. Mample, 46 Winter street, all of Buffalo.

The B. F. Brown Gas Engine Co., Syracuse, N. Y.; gas engines, turbines, motor boats, etc.; $50,000; by Benjamin F. Brown, Syracuse, N. Y.; Howard T. Gardenier, Chicago, Ill.; Charles A. Hull Jr., Morristown, N. J.

The Friction Metal Co., New York City; safety tread appliances, devices and machinery; $50,000; by John N. Williamson, Centreport, L. I.; Frederick B. Snow, 48 South Oxford street, and Julius C. Von Arx, both of Brooklyn, N. Y.

Canadian Ferro-Steel Co., Ltd., Bridgeburg, Ont., capital $40,000, to manufacture heating and ventilating apparatus; provisional directors, Albert E. Menke, George Austin, John McCoy, Ida Rittmeister and Mary L. Menke.

The Carbon Remover Co., Staatsburgh, N. Y.; $10,000; manufacture compounds to remove carbon deposits from engines; by George Brock, 349 Broadway, New York; C. W. H. Arnold, Harry B. Vosburgh, both of Poughkeepsie, N. Y.

The Standard Machine Tool Co., Ltd., Toronto, capital $100,000, an amalgamation of the Sanitary Carpet Cleaner Co., Ltd., and the Standard Contracting Co., Ltd. Among the directors are Herman Heintzman, John Firstbrook and Robert L. McCormick.

The Brockton Mowing Machine Cutter-Bar Co., Brockton, Mass.; agricultural implements and machinery; $50,000; by Walter L. French, 378 North Main street; Frank L. Fletcher, 106 Main street, Brockton.

The Brooklyn Scrap Iron Co., Brooklyn; deal in iron and steel, boilers, engines, machinery, tools, etc., $100,000; by Henry M. Mulstein, Joseph Lubin, both of 50 Berkeley place, Brooklyn; William Goldschmidt, 326 Fifth street, Brooklyn.

New Construction:—

The American Locomotive Co. has asked for bids on a three-story pattern and storage building to be constructed at the Dunkirk, N. Y., shops.

The Barney & Smith Car Co., Dayton, O., is constructing an addition to its plant which will be used for handling steel interior finish for passenger cars.

The Stover Engine Co., Freeport, Ill., has under construction a fireproof building, 60 x 100 feet, one story, which it will employ as an assembling room.

Plans of the Georgia Steel Co., Atlanta, Ga., subsidiary to the Southern Iron & Steel Co., provide for establishing a washer at the Bartow county iron ore mines.

The Alabama Rolling Mill Co., which recently acquired the plant of the Sheffield Rolling Mill Co., at Sheffield, Ala., has begun on its construction program. A 16-inch bar mill will replace the dismantled cotton tie mill.

The Buckeye Traction Ditcher Co., Findlay, O., has accepted plans for a brick and steel building, 120 x 300 feet, which will be located near the present structure. Bids were to be opened Oct. 26. A power house, electric light plant, air compressor, electric hoist and private telephone plant will be installed in the new building.

The Greensboro Machine Co., Greensboro, N. C., is erecting an addition, 60 x 160 feet, which it will later supplement with a 24-foot wing. The building is equipped with punches, shears, bending rolls and a traveling monorail crane for handling heavy machinery. It makes a

specialty of manufacturing slide valve engines up to 60 horsepower and Corliss engines from 60 to 100 horsepower.

General Industrial Notes:—

The Buckeye Jack Co., of Louisville, O., has purchased a bolt works at Alliance, O., to which it will remove and there begin work of filling a contract received from the Panama canal commission.

The General Fireproofing Co., of Youngstown, O., has been awarded the contract for furnishing all the steel furniture for the proposed court house at New Orleans, on its bid of $42,600.

The General Motors Co., of New Jersey, has purchased the Jackson-Church-Wilcox plant at Saginaw. The latter company had recently increased its capital to $60,000 and had completed new shops.

The Erie Foundry Co., Erie, Pa., advises that it has received orders for a 5,000-pound steam drop hammer for the Lakeside Forge & Wrench Co., Erie, and for 12 hammers of various sizes for the H. J. Martin Forging Co., Indianapolis.

Frank C. Caldwell, president of H. W. Caldwell & Sons, machinery builders, has purchased the plant of the Smeeth Copper & Bronze Co., on Western avenue, Chicago, with a ground frontage of 200 feet. He paid $3,000 in cash for it.

The capital stock of the Middletown Car Co., subsidiary to the Standard Steel Car Co., has been increased from $5,000 to $400,000. The stock increase is for the purpose of putting the Middletown, Pa., plant into shape, it having recently come into the possession of the Standard company by purchase.

Savage Mountain Fire Brick Co., Frostburg, Md., has elected these officers for the following year: President, Charles C. Gorsuch; vice president and treasurer, John A. Caldwell; secretary, H. C. Gorsuch. They, with George B. Jackson and H. G. Caldwell, constitute the board of directors.

The Baldwin Locomotive Works has received orders from the following companies: The Atchison, Topeka & Santa Fe, 20; the Georgia railroad, two; the Virginian Railway, six; the Missouri & North Arkansas, two. The Pennsylvania Railroad has ordered 96 all steel passenger cars from the J. G. Brill Co.

George D. Wick has purchased a 10-acre site along Crab creek, near Youngstown, and plans to remove the works of the Geary Iron & Steel Co. of Cleveland to the new location. The Geary company manufactures steel specialties, and was purchased by Mr. Wick about four years ago.

The Chicago iron ore mine at Guernsey, Wyo., of the Colorado Fuel & Iron Co., which has been idle two years because of the failure of the pumps to keep down the water, has been reopened. The output of the mine when the larger pumping plant is installed, will be from 30 to 40 car loads of ore a day.

The tool department of the new plant of the Western Motor Works at Marion, Ind., has been placed in operation, and it is expected that the other departments will be started shortly. The plant will make many of the tools used in the manufacture of its own product, and for that reason, the tool department has been started first.

The Southwestern Gate Co., Dallas, Tex., recently incorporated, advises that it was formed for the manufacture and sale of electric street crossing gates to be used by railroads at city grade crossings. No building will be done at present, and no equipment purchased, since the company has a contract with a Chicago foundry for the manufacture of its gates.

S. W. Vaughan is building a refining smelter on Tenth avenue, Lorain, O., in which he will refine scrap brass, copper, etc. Two furnaces will be installed in a building 40 x 60 feet. He has been successively connected with the Cambria Steel Co., as blast furnace superintendent, the National Tube Co., at Lorain, and later with the Pittsburg Reduction Co.

The plant of the Colean Mfg. Co., of East Peoria, Ill., has been sold to the Holt Mfg. Co., Stockton, Cal. The Holt company manufactures heavy traction engines, harvesting machinery, etc., and it proposes to manufacture at Peoria gasoline and kerosene traction engines used in plowing, etc. The Colean company went into the hands of a receiver last January.

The United States Cast Iron Pipe & Foundry Co. has filed two deeds transferring all of its real estate and buildings in Newport, Ky., including 27 lots and the buildings thereon for the consideration of $1, to Edward C. Maher, First National Bank building, Chicago. The plant has been idle for years, following the absorption of the Addystone Pipe Works by the United States company.

Trade Notes:—

The Southern Iron & Steel Co. has completed arrangements, whereby Nash, Isham & Co., New York, will handle the product of its Trussville and Chattanooga furnaces in the eastern territory.

The Warner & Swasey Co. recently opened an office in Detroit, located in the New Ford building. Thomas Farmer, who has for several years represented the Warner & Swasey Co. in the Detroit territory will be manager of that office.

A new core wash, which is the result of several years' experimental work and to which on account of its adhesive qualities the makers have given the name of "Bull Dog," has been placed on the market by the S. Obermayer Co., Cincinnati, who will supply descriptive literature free on application.

Fires:—

The Duplex Metals Co., Chester, Pa., sustained a loss of $1,000 by fire in its coating room.

The plant of the Federal Tool & Supply Co., at Alton, Ill., was seriously damaged Oct. 16.

The plant of the Crescent Foundry Co., Wilmington, Del., was burned Oct. 17, with a loss estimated at $30,000, partly covered by insurance.

Damage estimated at $7,500 was caused in the plant of the Bridgeport Forge Co., Bridgeport, Conn., Oct. 16.

The machine shop of Zela & Haineman, Newark, N. J., was damaged to the extent of $5,000, Oct. 20. The fire started in oily waste.

The shops of the Columbus Steel Tank Works, Kansas City, Mo., were badly damaged Oct. 15, the loss being placed at $25,000.

The office building of the Riter-Conley Mfg. Co., at Leetsdale, Pa., was damaged Oct. 19, causing a loss of about $8,000, covered by insurance.

The foundry of the Weatherly Foundry Co., Weatherly, Pa., was damaged to the amount of about $15,000, Oct. 14, insurance being $10,000.

The blacksmith shop of the St. John Iron Works, St. John, N. B., was damaged Oct. 13, the loss being estimated at $2,000, covered by insurance.

The annealing, core and shipping departments of the Michigan Malleable Iron Co., Detroit, sustained an estimated damage by fire of $35,000, Oct. 19.

Fire starting in the office of the Howard Tool & Mfg. Co., 436 West Madison street, Chicago, Oct. 19, spread to an adjoining structure and caused a loss of about $10,000.